

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

No. 3.

OCTOBER, 1916.

VOL. XX.

Published Monthly by the Department of Agriculture.

Edited by H. J. FINNIS.

CONTENTS.	PAGE.
POINTS FOR PRODUCERS	170
INQUIRY DEPARTMENT.. .. .	171-174
DAIRY AND PRODUCE MARKETS	174
ROSEWORTHY AGRICULTURAL COLLEGE—PERMANENT FIELD EXPERIMENTS (<i>to be continued</i>)	175-198
AGRICULTURAL EXPERIMENTS.. .. .	195-197
THE AGRICULTURAL BUREAU—TWENTY-SEVENTH ANNUAL CONGRESS (<i>to be continued</i>)	198-212
ADVISORY BOARD OF AGRICULTURE	213-214
MILK FEVER OR DROP AFTER CALVING	214-216
DIPPING SHEEP	217
THE AGRICULTURAL OUTLOOK	218
RAINFALL	219-220
AGRICULTURAL BUREAU REPORTS	221-250

All communications to be addressed:

“The Editor, Journal of Agriculture, Victoria Square, Adelaide.”

Notice re Copyright.—The Copyright in all articles in this Journal is vested in the Crown, and any person reproducing or republishing the said articles without permission from the Hon. Minister of Agriculture will be liable to be proceeded against.

CLARENCE GOODE,
Minister of Agriculture.

POINTS FOR PRODUCERS.

Hills Branches Agricultural Bureau Conference.

The Annual Conference of those Branches of the Agricultural Bureau situated in the Hills district is to be held at Morphett Vale on Thursday, October 12th. Sessions will be held in the morning and afternoon. Proceedings will be opened by the Hon. R. P. Blundell, M.P. (Minister of Industry), addresses delivered by departmental officers, including the Poultry Expert (Mr. D. F. Laurie), and papers read by members of the Branches.

Imports of Plants, Fruits, Etc.

During the month of August, 1916, 1,207bush. of fresh fruits, 9,916bush. of bananas, 20,176 bags of potatoes, 641 bags of onions, 52,906 heads of cabbages and cauliflowers, 180pkgs. of other vegetables, and 161 pkgs. of plants, trees, &c., were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910; 20bush. of bananas (over ripe) were destroyed, and 19pkgs. of tomatoes, &c., were returned owing to the absence of the necessary Phylloxera declaration. Under the Federal Commerce Act, 1,211 cases of fresh fruits, 4,819pkgs. of dried fruits, 300pkgs. of preserved fruits, and 1pkg. of plants were exported to oversea markets. These were consigned as follows:—For London, 7 cases of citrus fruits and 3,904pkgs. of dried fruit; for New Zealand, 1,204 cases citrus fruit, 615pkgs. of dried fruit, and 1pkg. of plants; for Vancouver, 300pkgs. dried fruit; for South Africa, 300 cases preserved fruit. Under the Federal Quarantine Act 2,854pkgs. of plants, seeds, bulbs, &c., were examined and admitted from oversea sources; 70 bags of linseed from Japan were cleaned at the Plant Quarantine Depot on account of the presence of proclaimed weed seeds.

During the month of September, 1916, 899bush. of fresh fruits, 12,460bush. of bananas, 17,536 bags of potatoes, 1,099 bags of onions, 11,220 heads of cabbages, 767pkgs. of other vegetables, and 130pkgs. of plants, seeds and bulbs were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910; 156bush. of bananas (over ripe) were destroyed. Under the Federal Commerce Act, 989 cases of fresh fruits, 2,263pkgs. of dried fruits, and 65pkgs. preserved fruits were exported to oversea markets. These were consigned as follows:—For London, 1,203pkgs. dried fruit and 25pkgs. preserved fruit; for New Zealand, 989 cases citrus fruit; South Africa, 460pkgs. dried fruit; India and East, 40pkgs. preserved fruit; Canada, 600pkgs. dried fruit. Under the Federal Quarantine Act 814pkgs. of plants, seeds, and bulbs were examined and admitted from oversea sources.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

VETERINARY INQUIRIES.

[Replies supplied by Mr. F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.]

"H. D. H.," Wirrabara, reports that pigs are affected with worms, and seeks treatment.

Reply—Feed daily equal parts of saltpetre, sulphur, charcoal. See that little pigs get a teaspoonful at each feed and older ones a dessertspoonful. The worms are the long round worm of the pig, *ascaris suis*.

"E. S. B.," Tongowoko, via Peake, has a mare over due to foal, hard udder.

Reply—This mare would be better for 10 drops of tr. pulsatilla during the last month of carrying her foal once daily, and under the present conditions the same dose morning, and 10 drops tr. belladonna evening, for a fortnight. The olive oil is good, but hot soapsuds would be cheaper and better as an application to the udder.

"B.," Brentwood, had mares troubled with stoppage after foaling.

Reply—The abdominal pain generally spoken of as stoppage that occurs after foaling is often due to overfulness of the bowels at the time, and generally to the severe muscular straining during birth. A good remedy is half a pint of gin, half a teaspoon of peppermint essence in half a pint of warm water.

"D. & T.," Nor'-West Bend, report that draught horses were turned out on rich irrigated feed. A gelding played with foal, went down as if to roll, groaned, quivered, and died. The other came in at fast trot with mob a few days later and repeated the performance, with the same result. No illness before, and nothing definite post mortem.

Reply—The symptoms are exactly those that come to hand often when feed is lush, and the point to be noted is, rapid action, playing with foal, trotting into stable; this rapidly increases the fermentation of the feed in the stomach, which distends to such an extent that the heart's action is mechanically stopped, thus bringing about the very sudden death. Should there be time for treatment, bleeding at the jugular is best, relieving the congestion, followed by ammonia in some form with peppermint extract.

"O. G. M.," Purnong, has a mare, aged, with hard lump on side caused by healing of swivel, stiff pus exudes from holes in swelling, mare is stiff in off fore leg.

Reply—The symptoms seem to point to infection of the abscess by some fungus, such as actinomycetes. It would be well to make a plaster of Venice turpentine and put on the sore for a few days, then clean off with spirit of iodine and lance boldly, bringing away any dead material in the sore; dress with the same spirit after, and when quite dry repeat the plaster, renewing it every few days, and kindly report progress in a fortnight or so. The stiffness may be from local glands becoming affected.

"W. L., jun.," Salt Creek, drove gelding, four years, 20 miles. The animal scoured and knocked up, swelled up and passed sand, lived a few days, with colic intermittently, and died.

Reply—The trouble was not lockjaw, but colic, the setting of the jaws at the end being due to pain which very probably resulted from a ruptured bowel. When a horse is sanded it is well to remove it by drenching with a pint and a half of milk in which a pound of honey has been dissolved.

"F. J. K.," Port Wakefield, has a gelding, three years, sluggish at work, gets stiff off side, and falls as if dead. Difficulty in passing water, which is as dark as blood.

Reply—The symptoms point to abscess caused by bloodworms and affecting the liver. Give him a long spell and a tablespoon of Fowler's solution of arsenic in a little bran every day for three weeks, and kindly report progress at the end of the time.

"L. S.," Mount Gambier, had ewes grazing three miles from coast for eight months. Lambs swell on one or other leg and lie about, biggest ones generally. Liver and blood dark, gall dark green.

Reply—Why was no examination made of the swelling on the legs, which would probably have revealed local inflammation, for the symptoms are those of "joint ill" rather than coast. The sheep should certainly be moved off the affected country, and will probably do better at once, although some more lambs will be affected. The only drug that does good as far as my experience goes is rather expensive; it is acetozone, and any abscesses should be opened and washed out with a 20 per cent. solution, and affected lambs should have a tablespoon of the same solution once or twice a day. The disease is very common in seasons such as the present, and shelter and hand feeding are advisable.

"H.," Brentwood, has a pig, three months, lost appetite, skin dried and cracked and turned red behind shoulders and ears.

Reply—The symptoms point to swine erysipelas. In a similar case open the bowels well with Epsom salts, and dress the skin with any cheap oil, such as fish oil. The disease is often fatal.

"A. D.," Keith, has a cow with perforated teat through injury.

Reply—As the fistula has been established it is to be feared that the difficulty will occur again as she comes in, but it would be well to thoroughly cauterise the hole with nitrate of silver and the cover with collodion. If the milk still escapes, the hole could be temporarily stopped with wax or bicycle cement and coated with collodion between milkings.

"M. H. C.," Reihill, has a cow which fails to come in season; slight blood streak appears in separator slime.

Reply—The blood is the result of a slight local weakness in the udder, and would probably disappear after a week's treatment of 10 drops of tr. arsenic on the tongue once a day for a week. She will probably come on heat as the season advances.

"H. W.," Bordertown, has a chestnut gelding, five years, always in poor condition after drought in North.

Reply—There is no doubt his constitution is undermined by the drought, but he will not pick up on hard work, though light regular work will be good for him. Give him two tablespoons of Fowler's solution of arsenic in feed once a day for a fortnight, stop for a fortnight, and repeat for another fortnight, and then report on his condition, quoting 2085.

"A. T.," Yadenarie, has pig, five months, in fair condition, but not as good as should have been; long round white worms like those passed by horses.

Reply—The worms are *ascaris suum*, closely related to the similar ones in horse and man. They do rob the pig of nourishment and cause bellyache and diarrhoea at times. Turpentine (1-2 teaspoons) in milk will clear them, but milk it does not finish the pig as well when drenching, which is best done by cutting a piece of the toe of an old boot and letting the pig chew on it while the medicine is slowly poured in. A better remedy is to feed cinders or charcoal regularly, and give a teaspoonful of sulphur in the feed once a day for ten days or so.

"W. J. H.," Port Lincoln, has a mare, nine years, in foal. Turned out on she-oak, came in very groggy on legs, groans, eats well, no pain, stands with hind legs tucked forward under her.

Reply—The change of feed has foundered her (laminitis), and possibly upset the foal. Stand her in mud and give 10 drops of tr. acouite three times a day on tongue for a fortnight or so. If not able to stand in mud, use cold swabs on her feet regularly. Report later if not doing as well as she should, quoting 2085.

"W. P.," Naracoorte, has a blood mare, breaking out in hind heels like grease, swelling about hocks and small lumps under skin, tender on feet, which smell badly, not hide bound, and appetite good. Doping suspected.

Reply—The conditions mentioned are the symptoms of blood disorder, and very probably the doping suspected has occurred, and it may seem strange to order a form of arsenic now, but as a certain food advertisement says, "There's a reason." Give her 10 drops tinct. arsenicum morning and evening either in a bit of bran or on her tongue. Dress the hoofs and frogs daily with an ointment made of equal parts mutton fat, resin, Stockholm tar, melted together, and as it is cooling stir in one-tenth part blue mercurial ointment. Apply camphor ointment to the cracks in the heels, camphor one, lard four parts.

"E. G.," Woodleigh, has a foal, 12 days; urine continually passes from navel.

Reply—This condition (pervious urachus) is due to the navel not properly shrivelling, the urine comes through it during life in the womb to form the contents of the water bag, and when it shrivels the urachus becomes the ligament of the bladder. The treatment commonly recommended is to apply a little red blister, failing this a pad of wool and tar or Venice turpentine or a little mustard. The idea is to form a swelling which closes the pipe and stops the trouble.

"L. G. B.," Coomandook, has a cow, poor, losing hair off neck and shoulders.

Reply—Poor animals that are improving in condition often lose hair in this way, and the new coat comes along all right. Sometimes lice are the trouble, in which case dressing occasionally with 1 part benzine and 4 parts any cheap oil will set the matter right.

"K. G. M.," Nantawarra, has mare with bad barbed wire cut.

Reply—From the description it would seem almost useless to attempt treatment, but if it is desired the wound should be supported by bandages and dressed twice a day with spirit of iodine, made by dissolving 1 drachm, i.e., as much as will lie on a shilling, of sublimated iodine in a pint of methylated spirit. If a dry dressing seems desirable a dusting powder of 1 part sulphur to 7 parts boracic acid may be used freely. As little washing or moistening of the wound as possible.

"D. A.," Wirrabara, has a horse with chaff in eye.

Reply—In the early stages the best way of removing the husk is to dip a feather in castor oil or glycerine and work it against the hackles over the eye, but when the husk is fixed it is necessary to inject 20 drops of 5 per cent. solution of cocaine and remove with forceps. Sometimes the husk goes, but leaves an impression as if it were still there, in such cases a little boracic acid blown into the eye once or twice a week assists recovery. In more severe cases it is well to wash the eye with a solution of two grains of nitrate of silver to an ounce of distilled water.

"A. V. C.," Belalie North, has a mare with fistulae of facial sinuses.

Reply—The breaking out and discharge above the nostrils is due to disease of the bone common in your district. Little can be done without an operation, which would not be altogether satisfactory. Dry up the discharge with powdered alum, and put plasters of Venice turpentine on the holes to draw the discharge occasionally.

HORTICULTURAL INQUIRIES.

[Replies supplied by G. QUINN, Horticultural Instructor.]

"E. B.," forwards questions which are replied to as follows:—

1. If 100 Brandis almond trees were planted apart from any other sort it is possible to obtain a crop, but the experience of recent years show a profitable crop is not expected from this variety, not even when other sorts are grown with it, which flower at the same time.

The Kaffir apple will make a splendid hedge in clay soils. The olive or carob would be better in limestone soils. These are much slower in growth than the orn. There are other hedge plants such as the *Rhamnus* and the *Tagosaste*, and lucerne, but stock will browse on the latter in summer if they can reach it.

For sandy soils the tamarisk is a rapid growing hedge, but it also must be protected against browsing stock. Pepper trees, if planted about 4ft. apart, will make a good hedge in dry country.

3. Olive trees are propagated from truncheons, planted horizontally, at about 4in. to 6in. beneath the soil. These are usually made from wood an inch or more in diameter, cut to, say, a foot or 15in. in length. These trees are also grown from seedlings, which are afterwards budded or grafted with the sorts desired.

4. The pips of orange, apple, or pear should not be allowed to get very dry before sowing. They are usually washed out of the pulp of the fruit, and sown thickly, practically right away in prepared beds, where the ground can be sheltered against extremes of heat or cold, and the young plants watered carefully.

POULTRY INQUIRY.

[Reply supplied by D. F. LAURIE, Poultry Expert.]

"H. D. H.," Wirrabara, asks the cause of fowls dying. They mope about, combs become dark, lose use of their legs; diarrhoea; will not eat; no tick or lice.

Reply.—The symptoms point strongly to tick as a cause, and no other. The poultry tick is no stranger in Wirrabara. Search the cracks and crevices of the woodwork, and saturate with kerosine.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on October 2nd:—

BUTTER.—Warmer conditions were experienced for a while in September, followed by magnificent general rains, and the quantity of dairy produce being produced is much more than was the case a month ago, with every indication of keeping up for some time to come. The surplus butter is going to markets mostly in the other States, though one fairly substantial shipment has already been made to England. At the closing of the month prices were:—"Alfa," 1s. 4d.; "Primus," 1s. 3½d.; third grade creamery, 1s. 1d. to 1s. 2d.; choice separators and dairies, 1s. to 1s. 1½d.; store and collectors', 1½d. to 1s. per lb.

EGGS.—Very heavy quantities of eggs are coming forward, but with good interstate demand and local picklers continuing to operate, the floors have been kept well cleared. The good weather is in favor of the quality, and prices are higher. Quotations, loose, at mart are:—Hen, 9d.; duck, 10d. per dozen.

CHEESE.—In cheese also much larger quantities are available, with values maintaining at late quotations. Fair interstate trade is being put through, and prices are from 7½d. to 8d. per lb. for large to loaf.

HONEY.—The first of the new season's take is arriving in small lots, which is finding sale at 4d. to 4½d. per lb. for prime clear extracted. Second grades have slow sale. Beeswax in good request at 1s. 5½d. per lb.

ALMONDS.—Market is bare, and buyers are already inquiring for the new crop. Prices, nominally:—Brandis, 9½d.; mixed softshells, 8½d.; hardshells, 4d.; kernels, 1s. 5½d. per lb.

BACON.—Values have improved in sympathy with the advance for the live animal. Local curers are finding it difficult to secure their wants, so that importations have been coming along to fill up the shortage. Best factory cured sides, 1s. 0½d. to 1s. 1½d. per lb.; hams, 1s. 2d. to 1s. 3d. per lb.

LIVE POULTRY.—The forwardings throughout the month have unfortunately been short of trade requirements. Prices have been well maintained, and buyers unable to fill all orders. Good table roosters, 3s. 3d. to 3s. 9d. each; nice conditioned cockerels, 2s. 9d. to 3s. 3d.; plump hens, 2s. 9d. to 3s. 6d.; light birds, 2s. to 2s. 3d.; ducks, 3s. to 4s.; geese, 4s. 6d. to 6s.; pigeons, 10d. to 10½d. each; turkeys, from 8½d. to 10½d. per lb. live weight for fair to prime table birds.

POTATOES AND ONIONS.—As weather conditions have been highly favorable for the rapid growth and early development of new potatoes, holders of old ones have become anxious to sell, with the result that prices have eased considerably. **ONIONS.**—Sellers in the South-East and Victoria are exceedingly anxious to quit, consequently the market has further weakened. Quotations:—Potatoes, £6 6s. to £7 ½s. per ton on rails, Mile End or Port Adelaide. Onions, £4 10s. to £5 per ton on

rails, Mile End or Port Adelaide.

ROSEWORTHY AGRICULTURAL COLLEGE.

SIXTH REPORT ON THE PERMANENT FIELD EXPERIMENTS, SEASONS 1904-1915.

[By WALTER J. COLEBATCH, B.Sc., M.R.C.V.S., Principal, Roseworthy Agricultural College, and R. C. SCOTT, Assistant Experimentalist.]

INTRODUCTORY.

The fifth report on the Permanent Experimental Field was issued two years ago, and its publication synchronised with the reorganisation of the Agricultural Department and certain consequential changes in the management of the College and its experimental work. In that report, Professor Perkins, to whom is due the credit of successfully inaugurating at Roseworthy College the first permanent field experiments in Australasia, undertook, in conjunction with his collaborator, Mr. W. J. Spafford, to review broadly the whole of the results obtained from the inception of the work up to the end of 1913. They summarised therein the conclusions at which they had arrived after nine years' study of permanent experiments systematically conducted under farm conditions. Their inferences are of much value, and it will be instructive to observe in the future the influence of successive seasons on the mean results that formed the basis of their deductions.

The prior reports have had reference to the plots arranged in the Permanent Experimental Field and Grainger's Superphosphate Plots, but in addition to these, there are a number of other plots of a permanent character that have now been established for a sufficient length of time to warrant inclusion, and consequently we have embodied the results obtained from them in the following pages.

Reports on the Roseworthy College Permanent Field Experiments have been published in the *South Australian Journals of Agriculture* of 1906, 1907, 1909, 1911, and 1914, and have also been issued in pamphlet form for general distribution.

The original plots, which were planned out in 1904, included manurial and rotational tests, most of which have been continued without interruption on the lines originally laid down.

It will be seen, however, on reference to the earlier reports, that a few plots that had already served the purpose for which they were established, have been rearranged, so as to permit of the investigation of other problems for which space could not be found in the original scheme.

SCOPE OF THE EXPERIMENTS.

In all there are over 250 acres at Roseworthy College devoted to experimental work of a permanent character. Roughly speaking, one-half of the plots are located in Field No. 4, and the other half in what is known as Grainger's Field.

The general arrangement and classification of the plots is here shown.

GENERAL ARRANGEMENT AND CLASSIFICATION OF PLOTS.

Nature of Experiment.	Location.	Date.
<i>A.—Tillage Experiments.</i>		
1. Depth of ploughing	Grainger's B	1910
2. Systems of cultivation	Grainger's A	1911
<i>B.—Manurial Experiments.</i>		
1. Phosphatic fertilisers—		
(a) Reversion plots	Grainger's D	1915
(b) Superphosphate	Grainger's C	1910
(c) Basic slag	No. 4	1905
2. Nitrogenous fertilisers—		
(a) Nitrate of soda	No. 4	1905 and 1912
(b) Sulphate of ammonia	No. 4	1911
3. Potassic fertilisers—		
(a) Sulphate of potash	No. 4	1911
(b) Muriate of potash	No. 4	1911
4. Complete manure—		
(a) Farmyard manure	No. 4	1906 and 1912
5. Soil amendment—		
(a) Lime	No. 4	1912
<i>C.—Rotational Experiments.</i>		
1. Two-course rotation—		
(a) Bare fallow	No. 4	1905
Wheat		
(b) Sorghum	No. 4	1906
Wheat		
2. Three-course rotation—		
(a) Bare fallow	No. 4	1905
Wheat		
Pasture (rape)		
(b) Bare fallow	No. 4	1911
Wheat		
Barley		
3. Four-course rotation—		
(a) Kale	No. 4	1914
Barley		
Pease		
Wheat		

GENERAL ARRANGEMENT AND CLASSIFICATION OF PLOTS—continued.

Nature of Experiment.	Location.	Date.
C.— <i>Rotational Experiments</i> —continued.		
4. Five-course rotation—		
(a) Bare fallow	No. 4	1911
Wheat		
Pease		
Wheat		
Barley		
(b) Bare fallow	No. 4	1914
Wheat		
Lucerne		
Lucerne		
Lucerne		

THE EXPERIMENTAL FIELDS.

It will be of assistance to our readers if we outline the history and all conditions of the fields in which these experiments are being conducted.

FIELD NO. 4.

There are 71 plots of two acres each in this field running north and south. Plots 1-61 inclusive were laid out in 1904, and seven years later a block of 20 acres on the western side was enclosed, giving room for 10 additional plots. The soil ranges in character from a medium to a strong loam, and is probably as uniform in quality as it is possible to obtain land in this district. There is a limestone bank that encroaches on one or two plots to some extent, and crossing the first series of plots is a depression that acts as a drainage course for flood waters in winter. These inequalities, however, are not of practical importance, and could not possibly affect the results to an appreciable extent.

The history of the field antecedent to 1904 is difficult to state precisely, as the boundaries of the present field do not correspond with the original lines of subdivision. The whole of two and portions of at least one other of the original fields are represented in what we now term Field No. 4, and in the ordinary course of farming these contributing fields will have received dissimilar treatment from year to year. Nevertheless, it is known that in earlier days the fields, as a general rule, were worked on a bare fallow-wheat rotation, with an occasional year in grass. When under wheat, the crop usually received 2cwts. to 2½cwts. of 37½ per cent. superphosphate per acre. The fallows were sometimes sown with sorghum in the spring, and in moist seasons some fine crops of summer forage were obtained. Complete physical and chemical analyses of this field are wanting, but the State Agricultural Chemist (Mr. J. H. Phillips, B.Sc.), who is responsible for the analyti-

cal data quoted in this report, has supplied the following information in respect of the plots receiving $\frac{1}{2}$ wt. dressings of superphosphate:—

Phosphoric Acid.—Total, soil, 0.031 per cent.; subsoil, 0.031 per cent. Available soil, 0.0023 per cent.; subsoil, 0.0015 per cent.

Carbonate of Lime.—Soil, 1.23 per cent.; subsoil, 1.86 per cent.

GRAINGER'S FIELD.

This field, which comprises about 220 acres, was purchased in 1909 and subdivided into four (4) paddocks, which are distinguished by the letters A, B, C, and D.

The soil throughout is fairly uniform in character, and partakes of the nature of a clay loam. It is typical of the bulk of the wheat growing soils in this district, and up to the time it was acquired by the College had not received artificial manures. It will be of interest to note the mechanical analysis of this type of soil.

TABLE I.—*Indicating Physical Character of Soil, Similar in Type to the in Depth of Ploughing Tests. Depth 0' 7".*

	Per Cent		Per Cent
Moisture.....	14.54	Clay.....	11.48
Stones, gravel, &c.....	1.63	Carbonate of lime.....	5.9
Coarse sand and fine gravel.....	16.76	Organic matter.....	2.97
Fine sand.....	31.47		
Silt.....	5.50	Total.....	100.00
Fine silt.....	10.16		

The surface soil rests upon a substratum of limestone rock and rubble, which overlies a fat yellow clay. We have not had a complete chemical analysis made of this land, but the soil on the unmanured plot has been tested for phosphoric acid and lime, with the following results:—

Phosphoric Acid.—Total, soil, 0.029 per cent.; subsoil, 0.030 per cent. Available soil, 0.0010 per cent.; subsoil, 0.0014 per cent.

Carbonate of Lime.—Soil, 2.04 per cent.; subsoil 6.95 per cent.

The history of the various subdivisions, so far as known up to the time when permanent experiments were initiated, is as follows:—

Grainger's A.—A field of 54 acres entirely given up to tillage experiments:—1907, wheat; 1908, stubble; 1909, fallow, 7in.; 1910, wheat, 15 $\frac{1}{2}$ bush; 1911, divided into plots, half fallowed and half left in stubble.

Grainger's B.—A field of 47 acres, 12 of which are utilised for depth of ploughing tests:—1908 fallow; 1909, wheat and oats; 1910, divided into plots, half fallowed and half left in stubble.

Grainger's C.—Comprises approximately 100 acres, and includes the "Grainger's Manure Plots" (45 acres):—1907, fallow; 1908, barley and oats; 1909, fallow. The manure plots were fenced off in 1909, and subsequently worked on the three-course system.

Grainger's D.—A field of 20 acres originally included in Grainger's C. It was subsequently fenced off in 1909, and treated as under:—1910, wheat; 1911, fallow; 1912, wheat; 1913, rape; 1914, mustard; 1915, reversion plots. The white mustard was a partial failure, and after being fed off the soil was cultivated up and the plots were set out and started on the bare fallow-manured fallow-wheat system.

SCALE OF VALUES ADOPTED.

It will be convenient if we include in these prefatory observations a schedule of rates adopted in the compilation of the numerous tables which this report must necessarily contain. In many instances the hay yields given have been calculated from total produce yields by means of the definite relationship between total produce and hay, namely, 82 to 100, worked out by our predecessors. The values of sheep and produce have not been modified to fit in with the abnormal conditions of the present-day markets, and this for the reason that in reporting on permanent experiments, comparisons should be made on the basis of average values under normal conditions. The only alteration made is one that affects cost of production, and that only to the extent of 5s. per acre. The following schedule will be useful for reference:—

SCHEDULE OF VALUES.

	s.	d.
Value of wheat	3	6 per bushel.
Value of barley	2	6 per bushel.
Value of hay	35	0 per ton.
Value of sheep	15	0 per acre per annum.
Value of superphosphate, basic slag	4	6 per cwt.
Value of potassic and nitrogenous manures	14	0 per cwt.
Value of farmyard manure	5	0 per ton in stack.
Value of lime	1	9 per cwt.

WEATHER CONDITIONS.

In entering upon a study of the climatic factors affecting agricultural operations, one of the first features to claim consideration is the rainfall and its distribution. Some of the experiments here reported on have now been established for 11 years, and it will be noticed that the mean fall for this period is almost the same as that recorded here for the past third of a century.

TOTAL RAINFALL.

We submit below the rainfall registered each month during the period 1905-1915 comparatively with the means:—

CLIMATIC CONDITIONS.

TABLE II.—*Showing the Yearly Rainfall, Month by Month, 1905-15, comparatively with the Means of 33 Years, 1883-1915.*

	1905. Inches.	1906. Inches.	1907. Inches.	1908. Inches.	1909. Inches.	1910. Inches.	1911. Inches.
January	2.27	0.00	0.65	0.48	0.75	1.72	0.60
February	0.13	0.08	0.33	0.45	0.28	0.60	2.13
March	0.08	2.64	0.17	1.09	1.17	4.43	0.66
April	2.10	0.45	2.79	0.76	1.91	0.23	0.33
May	2.24	0.99	1.96	3.36	2.89	3.20	1.79
June	2.07	2.84	1.57	2.83	1.84	2.81	2.33
July	2.58	1.99	1.15	1.47	3.80	2.86	1.56
August	0.87	3.36	2.25	1.79	4.56	1.32	0.68
September	1.17	2.65	1.08	3.09	1.52	2.64	2.53
October	2.95	1.77	1.22	2.15	2.55	2.55	0.37
November	0.25	2.26	1.94	0.07	2.08	1.18	0.04
December	0.00	0.70	0.62	0.21	0.70	0.93	1.44
Totals	16.71	19.73	15.13	17.75	24.05	23.87	13.68

	1912. Inches.	1913. Inches.	1914. Inches.	1915. Inches.	Means. 1905-1915. Inches.	Means. 1883-1915. Inches.
January	0.09	0.11	0.27	0.81	0.60	0.81
February	0.21	1.94	1.82	0.04	0.66	0.56
March	0.70	1.63	0.73	0.30	1.24	0.88
April	0.91	0.31	1.38	1.95	1.19	1.69
May	0.19	0.31	0.94	3.01	1.90	1.76
June	1.68	0.22	0.45	4.61	2.11	2.56
July	1.87	0.69	1.32	1.89	1.93	1.85
August	3.19	1.64	0.39	1.83	1.99	2.02
September	2.43	2.55	0.29	3.56	2.12	1.82
October	0.94	3.89	0.08	1.27	1.79	1.64
November	1.84	1.21	1.27	0.21	1.12	1.03
December	0.92	1.16	0.62	0.28	0.69	0.77
Totals	14.97	15.66	9.36	19.76	17.33	17.41

It may be noted that in the seasons 1914 and 1915, with which this report is chiefly concerned, the total rain differed considerably from the mean fall. In 1914 it amounted to little more than one half the normal total, whereas in 1915 we registered 2.35in. above it. The influence of such extreme departures from average weather conditions must tend to cause irregularities in the mean results of experiments that have only recently been inaugurated. Those that have been established for 15 or 10 years or more will not be seriously affected, and, in any case, when normal climatic conditions prevail, there would be no ground for placing reliance on figures derived from tests that have been under observation for two or three years.

Grain grown for ploughing or for grazing, and for which the soil is divided into small plots, will not be seriously affected, and, in any case, when normal climatic conditions prevail, there would be no ground for placing reliance on figures derived from tests that have been under observation for two or three years.

Where annual crops are concerned, however, the distribution of rain falling over the growing period is of greater importance than the yearly total, and we proceed, therefore, to an analysis of what is termed the "useful" rain into "seeding," "winter," "spring," and "early summer" rains.

"USEFUL" RAINFALL.

The following table contains particulars of the distribution of "useful" rain from 1905 to 1915 inclusive:—

TABLE III.—*Showing Distribution of "Useful" Rain, 1905-15, comparatively with Mean Distribution of 33 Years, 1883-1915.*

Year.	Seeding Rain (April-May) Inches.	Winter Rain (June-July) Inches.	Spring Rain (Aug.-Oct.) Inches.	Early Summer Rain (Nov.) Inches.	Total "Useful" (April- Nov.) Inches.	Rain without Influence on Cereals. Inches.
1905	4.34	4.65	4.99	0.25	14.23	2.48
1906	1.44	4.83	7.78	2.26	16.31	3.42
1907	4.75	2.72	4.55	1.94	13.96	1.17
1908	4.12	4.30	7.03	0.07	15.52	2.23
1909	4.80	5.64	8.63	2.08	21.15	2.90
1910	3.43	5.67	6.51	1.18	16.79	7.08
1911	2.12	3.89	3.40	0.04	9.45	4.23
1912	1.10	3.55	6.56	1.84	13.05	1.92
1913	0.62	0.91	8.08	1.21	10.82	4.84
1914	2.32	1.77	0.76	1.27	6.12	3.24
1915	4.96	6.50	6.66	0.21	18.33	1.43
Means—						
1905-15	3.09	4.04	5.90	1.12	14.16	3.18
1883-1915 ...	3.45	4.41	5.49	1.03	14.38	3.03

It is evident from these figures that the year 1914, in which the total rainfall was easily the lowest yet recorded, opened favorably, and a good seeding resulted. The April and May rains were somewhat scanty, but yet sufficient to promote healthy germination and first growth. The winter proved exceptionally dry, only 1.77in. being measured, and several severe frosts were experienced.

The dryness of the winter months, however, was wholly eclipsed by the drought that set in at the end of July. Given one or two soaking downpours in August or September, the crops would have yielded fair returns, but with a total spring fall of approximately three-quarters of an inch, spread over a period of three months, the crops barely succeeded in reaching maturity—in fact, in one or two instances, the crops had to be abandoned, and stock were turned in to dispose of such growth as had managed to struggle through.

One result of the drought was to bring about an early harvest, and by the end of November all our crops had been threshed. From this it will be seen that the 1.27in. of November rain were in reality far from being "useful"; on the contrary, this fall merely served to hinder harvesting operations.

The 1915 season was remarkable for the relatively high proportion of the total rain that was "useful." The seeding rains were favorable, there being heavy showers towards the middle of May, followed by substantial falls a month later. This led to excellent seeding conditions, and the crops were sown in ample time on clean and well-worked fallows.

Both the winter and spring rains were above the average, and although several frosts occurred, the crops were not injured by them.

The months of October and November were relatively warm, and this, in conjunction with the heavy spring rainfall, led to weak, sappy growth that favored the *puccinia graminis* fungus, and rendered the crops very susceptible to damage from rough weather. The red rust parasite took full advantage of the lowered resistance of the crops, and many of the plots became so badly affected that the grain was small and pinched.

It is worth noting that the large amount of useful rains recorded in 1915 discounted the value of the fallow rains of the year before.

For comparative purposes, it is useful to observe that the average hay and grain yields on the College Farm for 1914 and 1915 were as follows:—1914—Hay, 14cwts. 75lbs. per acre; wheat, 11bush. 28lbs. per acre. 1915—Hay, 2 tons 17cwts. 23lbs. per acre; wheat, 21bush. 13lbs. per acre.

"FALLOW" RAINS.

It is generally conceded that the rain falling on a properly treated bare fallow is retained to a considerable extent, and is of more or less benefit to the succeeding crop, according to the amount of useful rain that falls on the crop.

In the following table we have summarised the available data concerning the "fallow" rains since 1904.

TABLE IV.—Showing "Fallow" Rains—August 1st of one Year to March 31st of Succeeding Year, 1905-15—comparatively with Means of 33 Years, 1883-1915.

Season.	In.	Season.	In.
1904/1905	7.18	1910/1911	11.41
1905/1906	7.96	1911/1912	5.88
1906/1907	11.29	1912/1913	13.00
1907/1908	9.13	1913/1914	13.07
1908/1909	9.51	1914/1915	3.86
1909/1910	17.56		
Means		1904/1915	9.88
Means		1883/1915	9.41

These figures serve to show that the fallow rains in 1913-14 were decidedly above the average, whereas in 1914-15 they amounted to only 3.86in., as against a mean fall of 9.61in. It is somewhat remarkable, and possibly misleading to some extent, that the crops sown on well-soaked fallows, but grown under droughty conditions, failed, whereas those raised on the sparsely moistened 1914 fallows, under a "useful" rainfall of 18.33in., gave highly satisfactory returns.

GENERAL CHARACTERISTICS OF THE PRECEDING NINE SEASONS.

In order to complete the weather comments, and to enable those who peruse the subsequent pages of this report to fully comprehend the significance of the figures recorded, and the reasons for the conclusions drawn, the climatic conditions that characterised the previous nine years—1905 to 1913 inclusive—are here given in brief summary:—

Season 1905-06 was characterised by very favorable seeding weather; by a cold, wet winter, without, however, much frost; by a late, cold spring; and finally by very favorable ripening weather. Both hay and grain yields were exceptionally heavy, and of excellent quality. The general College Farm yield of hay was represented in this season by 3 tons 5cwt. 67lbs. to the acre, and the general wheat yield by 24bush. 11lbs. to the acre.

Season 1906-07 opened with unfavorable seeding weather, followed by a very dry, though mild, winter. The spring months were, on the whole, unusually moist; unfortunately high temperatures accompanied by severe northerly winds set in rather suddenly, and blighted off many of the crops. The hay crops, although bulky in appearance, did not weigh well and were poorer in quality, whilst much of the grain was shrivelled and inferior. The general College Farm hay average was represented by 2 tons 11cwt. 90lbs., and the wheat average, 14bush. 30lbs. to the acre.

Season 1907-08 opened with favorable seeding weather, succeeded, however, by a very cold, dry winter; 18 heavy frosts were recorded this winter. Spring months were both dry and hot, and both hay and grain yields were light, although of good quality. The general hay average on the College Farm was represented by 1 ton 15cwt. 108lbs., and the general wheat average by 13bush. 20lbs. per acre.

Season 1908-09 opened with favorable seeding weather, followed again by a cold, dry winter, amply compensated for, however, by copious September and October rains. Ripening weather, too, was very favorable, and in the end both hay and grain crops were heavy in yield and of excellent quality. The general hay average on the College Farm was represented by 2 tons 7cwt. 5lbs. to the acre, and the wheat average by 22bush. 14lbs. to the acre.

Season 1909-10 again opened with favorable seeding weather, albeit at times somewhat wet for field operations. The winter months were exceptionally wet, and many crops in the district were under water for several weeks, much to their detriment. Spring months were very moist and favorable, and all crops were most promising in appearance until early summer, when some of the most forward were slightly blighted off by hot weather. In the end both hay and grain crops were very heavy and of exceptional quality. The general hay average on the College Farm was 2 tons 15cwt. 68lbs. to the acre, and the wheat average 25bush. 5lbs. to the acre—the highest grain average hitherto recorded on the College Farm.

Season 1910-11 was characterised chiefly by unfavorable seeding weather, followed by exceptionally wet winter and spring months. The ripening period was favorable. Eventually hay crops were very heavy, but grain crops rather light and poor in quality. The general hay average on the College Farm was represented by 2 tons 7 cwt. 31 lbs. to the acre, and the grain average 17 bush. 26 lbs.

Season 1911-12 was remarkable for the general shortage of the rainfall; seeding rains, winter rains, spring rains, and early summer rains were one and all below the normal average of the district, moreover seeding rains did not reach us until the middle of May. Finally, November was unduly hot, and hindered the ripening off of the grain crops. Our hay crops were of fair quality, and averaged on the Farm 1 ton 8 cwt. 6 lbs. to the acre, whilst the Farm wheat crops averaged 14 bush. 17 lbs. to the acre.

Season 1912-13 was again a season of low rainfall. There were practically no seeding rains; rain sufficient to bring about the germination of sown crops did not come until the last week in June. Winter rains were fair, although still below the normal mean, whilst spring and early summer rains were exceedingly copious and well timed. Towards mid-October, College crops promised to be exceptionally heavy; unfortunately the latter end of the month proved very dry and hot, and the crops experienced a rather severe setback. The average hay yield on the College Farm was 1 ton 14 cwt. 90 lbs. to the acre, and the average wheat yield 19 bush. 36 lbs. to the acre.

Season 1913-14. We have to note for this season almost complete absence of both seeding rains and winter rains, with the result that crops that had been sown in April and May did not germinate until the beginning of August. Spring rains, on the other hand, were abnormally heavy. These late germinating crops made rather rank growth in the spring, and ultimately succumbed to red rust and untimely hot north winds. The College Farm hay and wheat yields were the lowest on our records, viz., for hay, 16 cwt. 7 lbs. to the acre, and for wheat, 6 bush. 32 lbs. to the acre.

(A)—TILLAGE EXPERIMENTS.

The magic influence of phosphatic fertilisers on the agricultural development of South Australia has had the effect of dwarfing the importance of soil tillage. It must be patent to all, however, that improved methods of fallowing have contributed very largely to the success of our farming system. Early in the history of the State farmers learnt the need of fallowing, and the first principal of this institution was an insistent advocate of thorough cultivation.

It was not, however, until the apostles of so-called "dry farming" began to voice the claims of a particular form of tillage that experimentalists gave serious attention to the relative merits of different systems of soil culture.

In our view sufficient study has not been given in the past to this phase of farming, and we hope to extend the area devoted to it in the near future. For the present we must confine our attention to two groups of plots, one of which is designed to bring out the effects of ploughing land at different depths, whilst the other is arranged to contrast the effects of six different modes of fallowing.

(a) DEPTH OF PLOUGHING.

The depth to which the soil should be ploughed in order that the maximum returns may be obtained from it is of fundamental importance. The basis of all sound systems of arable farming is good ploughing, and no matter how skilfully the work be performed ploughing can never be regarded as satisfactory unless the soil has been turned to a proper depth. The ideal depth is one that in an average season will lead to the most profitable crops, and at the same time contribute towards the general improvement of the land. It would appear to be a relatively simple matter to determine experimentally the optimum depth of furrow for any district, but in reality the problem is beset with difficulties. The results obtained from test plots of different depths will always be influenced by a number of varying factors, such as climatic conditions, character of crops grown, time of ploughing in relation to rainfall, and both prior and subsequent treatment of the land. In humid climates where, in the ordinary course of farming operations, land is lifted at different seasons in preparation for crops dissimilar in habits and requirements, and where the bare or dead fallow is only resorted to occasionally in order to clean a foul field, the problem is much more complex than it is under the bare fallow, wheat rotation, which predominates in South Australia. Even under this simple system, however, it is found to be necessary to modify the furrow depths according to circumstances. Thus late fallows are always ploughed shallower than early ones; light sandy and gravelly soils should not be turned as deeply as strong clay loams; many peaty soils do best when ploughed relatively shallow. Nevertheless, in any particular locality it is possible to determine by permanent field plots the most profitable depth at which to plough land under any given circumstances, and the results thus obtained might fairly be assumed to apply to all soils of approximately the same character, situated in districts that experience similar climatic conditions. It is obviously essential, therefore, that in submitting the results of any such experiments the character of the land, the features of the climate, and precise details as to the treatment should be clearly described.

The depth of ploughing plots are located in Grainger's B Field, a full description of which has been given in the prefatory remarks. Descriptive notes on general weather conditions have also appeared in preceding pages, but it was deemed advisable in connection with this experiment to measure the actual amount of rain that descended on the plots instead of applying the results obtained at the central gauge, which is situated about two miles distant.

The records thus obtained are as follows:—

TABLE V.—*Showing Amount of Rain Registered in Rain Gauge located in Grainger's B, 1911-15.*

	1911.	1912.	1913.	1914.	1915.	Means 1911/1915.
	In.	In.	In.	In.	In.	In.
January	0.05	0.07	0.07	0.21	0.66	0.21
February	2.47	0.11	1.39	1.98	0.02	1.19
March	0.60	0.56	1.34	0.71	0.27	0.70
April	0.31	0.68	0.26	0.83	1.76	0.77
May	1.79	0.13	0.25	1.02	3.04	1.25
June	2.12	1.56	0.16	0.48	3.35	1.53
July	1.77	1.73	0.64	1.17	1.62	1.39
August	0.63	2.94	1.48	0.30	2.35	1.54
September	2.41	2.22	2.62	0.41	3.51	2.24
October	0.38	1.59	3.51	0.06	1.45	1.40
November	0.60	1.25	1.34	1.42	0.21	0.84
December	1.10	0.57	1.05	0.62	0.28	0.72
Totals	13.63	13.41	14.11	9.21	18.52	13.78

The mean fall for the period 1911-15 is decidedly low for the district, being 4.63in. less than the normal, that is, below the mean fall for the past 33 years. It is also nearly 1in. less per annum than that registered at the central gauge for the same period. The point to be noted then is that the results now being reported upon have been obtained under abnormally dry conditions. In 1915 the rainfall slightly exceeded the normal, but for the four years immediately preceding the mean fall was approximately 5in. below the average for the district. This means that the whole of the yields recorded below, with the exception of those for 1911, were obtained from crops grown on land that was fallowed up in years of abnormally low rainfall. Copious rains fell in 1910, a fact which must be remembered in connection with the figures for 1911.

ARRANGEMENT OF PLOTS.

At the time of purchase the field was in a state of bare fallow, and the same year was sown with wheat and oats for a hay crop. The following season 12 one-acre blocks were surveyed off, and every alternate one was bare fallowed. The plots are arranged in pairs so as to suit the two-course—bare fallow, wheat—rotation. The first pair of plots are ploughed to a depth of 2in., and the depth increases by 2in. gradations up to a maximum of 12in. for the last pair.

TREATMENT OF PLOTS.

The whole of the plots are ploughed up in the winter, the actual date varying according to the season. The earliest ploughing took place in 1911, the work being started on June 30th, and the latest c

in 1913, when the want of rain caused us to delay operations till the second week in August. A single-furrow plough is employed, and owing to the care required to ensure strict adherence to the conditions imposed the work extends over about eight days.

After the winter the plots are cultivated as deemed advisable in order to maintain a clean surface. The 2-in. plot, of course, can only be worked to the depth of the ploughing, and consequently it is sometimes necessary to give it an additional stirring, but the remainder of the series are cultivated to an average depth of 4in. At seeding time the plots are usually drilled in May after a scarifying and sometimes a harrowing; in this respect all plots receive the same treatment. The seed sown is pickled, graded wheat (85-95lbs. per acre), and the manure is 36-38 superphosphate (2cwts. per acre). A stroke of the harrows concludes the work on the plots till harvest comes round. The crops are cut and threshed and the stubbles are grazed off with sheep.

YIELDS OF PLOTS.

The yields of grain and total produce for each year of the test, as well as the means for the whole period, are given below:—

TABLE VI.—*Showing Yields from Depth of Ploughing Plots, 1911-15.*

Depth.	Grain per Acre.					Mean.
	1911.	1912.	1913.	1914.	1915.	
	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	
2in.	19 31	19 10	11 15	8 28	18 53	15 27
4in.	27 10	21 58	7 31	10 47	14 7	16 19
6in.	25 29	21 39	7 48	10 19	16 37	16 22
8in.	28 23	21 22	8 34	10 21	17 53	17 19
10in.	27 23	21 42	9 11	9 42	18 5	17 13
12in.	26 33	22 54	8 32	9 6	20 14	17 28

Depth.	Total Produce per Acre.										Mean.	
	1911.		1912.		1913.		1914.		1915.			1911/1915
	T.	C. L.	T.	C. L.	T.	C. L.	T.	C. L.	T.	C. L.		
2 in.	1	18 94	1	13 64	19	32	12	106	1	16 98	1	8 34
4 in.	2	3 84	1	16 58	13	94	15	30	1	9 82	1	7 92
6 in.	2	3 109	1	13 109	14	32	12	6	1	15 5	1	7 97
8 in.	2	6 78	1	12 56	15	20	13	109	1	17 41	1	9 16
10 in.	2	4 72	1	14 39	16	43	10	60	1	18 74	1	8 102
12 in.	2	6 58	1	13 80	12	86	9	42	1	19 37	1	8 38

The deeper ploughings have, on the average, given slightly higher yields than the lighter furrows in grain as well as in hay. Thus we see that the average grain return from the 4-in. plot is 16bush. 19lbs., whereas the 8-in., 10-in., and 12-in. plots have yielded 17bush., plus 19lb., 13lbs., and 28lbs. respectively. These differences, however, are

smaller than we have anticipated, a matter of only 2bush. separating the extremes. The plots, however, have grouped themselves in a fairly regular series, and it seems clear that the depth of ploughing has a direct effect on the grain yield. Reference to the figures for the years 1914 and 1915 bring out the preponderating influence of rainfall as a factor in wheat growing. Thus we see that, whereas in the dry year the medium depths of ploughing gave the best grain crops, in the wet year that followed the arrangement of plots in order of yield is practically reversed. The behaviour of the 2-in. plots is not always easy to understand. In three seasons out of five it has been the least productive, and in the other two it has been in advance of all the plots. The three years of low yield were certainly dry years, and one of the other two (1915) was a year of good rainfall; in the remaining season (1913) the seeding rains did not fall and the crops failed to germinate till August, which may account for the better growth on the shallow-ploughed land.

With regard to total produce of hay yields, the highest mean yield has been given by the 8-in., and the lowest by the 4-in., ploughing. Here again the plots come very near together, the maximum discrepancy between any two plots being 1cwt. 31lbs., and since this represents a range of only about 4 per cent. no great importance should be attached to the inferences based upon these results.

For what they are worth, however, we give below tables showing the net values of the differences between the mean grain and hay yields:—

TABLE VII.—*Showing Comparative Values of Grain Yields from Depth of Ploughing Plots, 1911-15.*

INCREASE OVER OR DECREASE BELOW.															
Depth.	Mean Yield.		2in.					4in.					6in.		
			Diffce. in Yield.	Value at 3s. 6d. per Bush.		Net Value.	Diffce. in Yield.	Value at 3s. 6d. per Bush.		Net Value.	Diffce. in Yield.	Value at 3s. 6d. per Bush.		Net Value.	
				B. L.	s. d.			B. L.	s. d.			B. L.	s. d.		B. L.
2in.	B.	L.	B. L.	s. d.	s. d.		B. L.	s. d.	s. d.		B. L.	s. d.	s. d.		
4in.	16	19	0	52	3 0	3 6	—	—	—	—	—	—	—	—	
6in.	16	22	0	55	3 2	2 2	0	3	2	-1 4	—	—	—	—	
8in.	17	19	1	52	6 6	3 6	1	0	3	6 0	0 0	0 57	3 4	1 4	
10in.	17	13	1	46	6 2	0 2	0	54	3 2	-3 4	0 51	3	—	-2 0	
12in.	17	28	2	1	7 1	-2 11	1	9	4	-6 6	1 6	3 10	—	-5 2	

TABLE VII.—*Showing Comparative Values of Grain Yields from Depth of Ploughing Plots, 1911-15—continued.*

INCREASE OVER OR DECREASE BELOW.

Depth.	Mean Yield.	8in.				10in.			
		Diffce. in Yield.	Value at 3s. 6d. per Bush.	Net Value.	Diffce. in Yield.	Value at 3s. 6d. per Bush.	Net Value.	Diffce. in Yield.	Value at 3s. 6d. per Bush.
	B. L.	B. L.	s. d.	s. d.	B. L.	s. d.	s. d.	B. L.	s. d.
0.	15 27	—	—	—	—	—	—	—	—
2.	16 19	—	—	—	—	—	—	—	—
4.	16 22	—	—	—	—	—	—	—	—
6.	17 19	—	—	—	—	—	—	—	—
8in.	17 13	-0 6	-0 4	-3 4	—	—	—	—	—
10in.	17 28	0 9	0 6	-6 6	0 15	0 10	-3 2	—	—

TABLE VIII.—*Showing Comparative Values of Hay Yields from Depths of Ploughing Plots, 1911-15.*

INCREASE OVER OR DECREASE BELOW.

Depth.	Mean Yield.	2in.				4in.				6in.			
		Diffce. in Yield.	Value at 35s. per Ton.	Net Value.	Diffce. in Yield.	Value at 35s. per Ton.	Net Value.	Diffce. in Yield.	Value at 35s. per Ton.	Net Value.	Diffce. in Yield.	Value at 35s. per Ton.	Net Value.
	T. C. L.	C. L.	s. d.	s. d.	C. L.	s. d.	s. d.	C. L.	s. d.	s. d.	C. L.	s. d.	s. d.
2in. ...	1 14 58	—	—	—	—	—	—	—	—	—	—	—	—
4in. ...	1 12 94	-1 76	-2 11	-2 5	—	—	—	—	—	—	—	—	—
6in. ...	1 12 100	-1 70	-2 10	-3 10	0 6	0 1	-1 5	—	—	—	—	—	—
8in. ...	1 15 60	1 2	1 9	-1 3	2 78	4 9	1 3	2 72	4 7	2 7	—	—	—
10in. ...	1 16 29	0 83	1 2	-4 10	2 47	4 3	-2 3	2 41	4 2	-0 10	—	—	—
12in. ...	1 14 63	0 5	0 1	-9 11	1 81	3 2	-7 6	1 75	2 11	-6 1	—	—	—

INCREASE OVER OR DECREASE BELOW.

Depth.	Mean Yield.	8in.				10in.			
		Diffce. in Yield.	Value at 35s. per Ton.	Net Value.	Diffce. in Yield.	Value at 35s. per Ton.	Net Value.	Diffce. in Yield.	Value at 35s. per Ton.
	T. C. L.	C. L.	s. d.	s. d.	C. L.	s. d.	s. d.	C. L.	s. d.
2.	1 14 58	—	—	—	—	—	—	—	—
4.	1 12 94	—	—	—	—	—	—	—	—
6.	1 12 100	—	—	—	—	—	—	—	—
8.	1 15 60	—	—	—	—	—	—	—	—
10in.	1 15 29	-0 31	-0 6	-3 6	—	—	—	—	—
12in.	1 14 63	-0 109	-1 8	-8 8	-0 78	-1 3	-5 3	—	—

For the purposes of the above tables we have adopted the following arbitrary scale of costs:—Two-inch ploughing, 5s.; 4-in. ploughing, 4s. 6d.; 6-in. ploughing, 6s.; 8-in. ploughing, 8s.; 10-in. ploughing, 11s.; 12-in. ploughing, 15s.

The draught on the plough for 2-in. ploughing is, of course, lighter than for 4-in.; but owing to the shallow depth it is necessary to cut very narrow furrows in order to be able to turn the land over properly. Hence more time is required to plough an acre of land 2in. than 4in. The subsequent working is practically the same for all the plots, and has, therefore, been omitted from the above calculations. The net value figures indicate that the 4-in. and 8-in. plots are equally profitable for grain production. In respect to hay growing the net figures show the 2-in. ploughing to have yielded 1s. 3d. per acre better than the 8-in., and 2s. 5d. ahead of the 4-in.

It must be admitted that these results are as yet inconclusive, and more interest will surround them when the period which they extend over has a mean rainfall that approaches closely to the normal annual precipitation for the district.

(b) SYSTEMS OF CULTIVATION.

In 1911 a field of 54 acres, known as Grainger's A, was mapped out into 12 plots, four acres in extent, in order to accommodate six pairs of plots on which to put to the practical test four systems of winter and two of spring fallowing. The field adjoins the ploughing depth plots, and therefore the notes on weather given in respect of them will apply equally well to the experimental area now under consideration. It may be well to add, however, that in three out of four seasons the spring rains were heavy relatively to the winter rains, and thus tended to favor the plots fallowed late.

The general plan of the experiments, together with the details of the operations carried out during 1914-15, are given hereunder:—

SCHEME OF CULTIVATION EXPERIMENTS.

PLAN OF EXPERIMENT.

Early Fallows.

1. Ploughed 7in. deep and immediately rolled with heavy roller. Cross cultivated before September 1, and harrowed immediately after. Cultivated and harrowed subsequently as often as surface crust or weeds rendered necessary.
2. Ploughed 7in. deep and immediately harrowed, cultivated before September 1, and subsequently as often as found necessary.
3. Ploughed 7in. deep and cultivated three times in course of season. Harrowed at seeding.
4. Ploughed 7in. deep, cross-skim ploughed before September 1, and subsequently cultivated as often as necessary.

Late Fallows.

5. Ploughed 7in. deep after September 1; heavily rolled same day as ploughed. Cultivated not later than three weeks after rolling, and if possible after rain. Rolled if necessary. Cultivated or harrowed or both according to condition of tilth.
6. Ploughed 4in. deep after September 1, cultivated after fall of rain and subsequently as often as necessary.

OPERATIONS CARRIED OUT IN 1913-14.

Early Fallows.

1. Ploughed 7in. deep July 22; rolled July 24; cultivated August 18, October 1-3, November 4-5, January 28, March 2, April 22; harrowed August 19, November 18, February 3, April 29.
2. Ploughed 7in. deep, July 24; harrowed July 25, November 18, February 3, April 29; cultivated August 18, October 1-3, November 4-5, January 28, March 2, April 22.
3. Ploughed 7in. deep July 26-29; cultivated October 1-3, November 4-5, January 29, March 3, April 24-27.
4. Ploughed 7in. deep July 26-29; cross-skin ploughed August 19; cultivated October 1-3, November 4-5, January 29, March 3, April 24-27; harrowed November 18, February 3, April 30.

Late Fallows.

5. Ploughed 7in. deep and rolled same day, September 29-30; cultivated October 1-3, November 4-5, January 29, March 3, April 24-27; harrowed November 18, February 3, and April 30.
6. Ploughed 4in. deep, September 27; cultivated October 1-3, November 4-5, January 28, March 2, April 22; harrowed November 18, May 4.

OPERATIONS CARRIED OUT IN 1914-15.

Early Fallows.

1. Ploughed 7in. deep, July 13 and 14; rolled July 16; cross cultivated August 17; harrowed August 17; cultivated October 9, November 18, December 21, January 29, April 20; harrowed April 21.
2. Ploughed 7in. deep July 14-15; harrowed July 16-18; cultivated August 17, October 9, November 18, December 21, January 30, April 20; harrowed April 21.
3. Ploughed 7in. deep July 16; cultivated October 9-10, December 22, April 21; harrowed April 22.
4. Ploughed 7in. deep July 15-20; cross-skin ploughed August 18; cultivated October 12, November 19, December 21, February 2, April 22; harrowed April 23.

Late Fallows.

5. Ploughed 7in. deep and rolled same day, September 22-25; cultivated October 12 (not after rain, 60 points during preceding month); rolled November 2-3; cultivated November 13, November 19, December 21, February 2, April 22; harrowed April 23.
6. Ploughed 4in. deep September 26-29; cultivated November 19 (after 31 points of rain); cultivated December 22, February 2, April 22; harrowed April 23.

The general practice is to sow these plots in good time with an early reliable wheat at the rate of 1½ bush. per acre with 20wts. of superphosphate. The early fallows generally start away before the others, the harrowed and skim ploughed plots being particularly quick to braird. Owing to special circumstances the crop has had to be cut for hay in two out of the four seasons under review, and hence we are only able to contrast the plots on the basis of hay yields.

The following table sets out the annual and mean hay yields from 1912-15 inclusive:—

TABLE IX.—*Containing Hay Yields of Cultivation Plots in Graginer's A, 1912-15.*

1912-15.													Mean Hay			
Plot.	Annual Hay Yields.												Yields.			
	1912.			1913.			1914.			1915.			1912/1915.			
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.	
1	2	3	90	1	0	55	18	75	1	18	109	1	10	54	1	
2	2	5	66	0	18	29	16	71	1	18	22	1	9	75	1	
3	2	1	37	0	16	95	17	40	2	2	23	1	9	49	1	
4	2	5	62	0	17	25	17	51	2	4	106	1	11	33	1	
Mean yield of early fallows													1	10	25	1
5	2	7	86	0	14	80	19	94	2	6	109	1	12	36	1	
6	1	12	75	0	11	70	12	98	2	2	29	1	14	96	1	
Mean yield of late fallows													1	8	66	1

Before entering upon a discussion of this statement of yields it will be advantageous to ascertain the expenditure incurred for tillage under each system and then to work out the net values of the increments or deficiencies in yield so that comparisons may be instituted on a proper basis. We have ascertained by consulting the records that the tillage operations have cost on the average for the past four seasons from 14s. 2d. on the 4-in. late fallow to 22s. 10d. per acre on plot 1.

The corresponding expenditure on plots 2, 3, 4, and 5 have been 20s. 4d., 15s. 3d., 20s. 7d., and 21s. 11d. respectively.

In computing these charges we have adopted the following rates:—

Ploughing, 7in.	7s. per acre
Ploughing, 4in.	4s. 6d. per acre
Skim-ploughing, 2½in. to 3in.	2s. 6d. per acre
Rolling (heavy)	2s. per acre
Cultivating	2s. per acre
Harrowing	9d. per acre

TABLE X.—*Showing Comparative Values of Difference in Hay Yields from Cultivation Plots, 1912-15.*

INCREASE OVER OR DECREASE BELOW.

Plot.	Mean Hay Yield, 1912-15.	Value at 35s. per Ton.	Plot 1.			Plot 2.			Plot 3.		
			Diffce. in Yield.	Value at 35s. per Ton.	Net Diffce. in Value.	Diffce. in Yield.	Value at 35s. per Ton.	Net Diffce. in Value.	Diffce. in Yield.	Value at 35s. per Ton.	Net Diffce. in Value.
	T. C. L.	£ s. d.	C. L.	s. d.	s. d.	C. L.	s. d.	s. d.	C. L.	s. d.	s. d.
1	1 10 54	2 13 4	—	—	—	—	—	—	—	—	—
2	1 9 75	2 11 11	-0 91	-1 5	1 1	-0 26	-0 5	4 8	—	—	—
3	1 9 49	2 11 6	-1 5	-1 10	5 9	2 7	1 96	3 3	—	—	—
4	1 11 33	2 14 9	0 91	1 5	3 8	1 70	2 10	2 7	2 99	5 1	-1
5	1 12 36	2 16 7	1 94	3 3	4 2	2 73	4 8	3 1	4 65	-8 0	-6
6	1 4 96	2 3 6	-5 70	-9 10	-1 2	-4 91	-8 5	-2 3	—	—	—

TABLE X:—*Showing Comparative Values of Difference in Hay Yields from Cultivation Plots, 1912-15—continued.*

INCREASE OVER OR DECREASE BELOW.

Plot.	Mean Hay Yield, 1912-15.			Value at 35s. per Ton.	Plot 4.			Plot 5.		
					Diffce. in Yield.	Value at 35s. per Ton.	Net Diffce. in Value.	Diffce. in Yield.	Value at 35s. per Ton.	Net Diffce. in Value.
	T.	C.	L.	£	s.	d.	s.	d.	s.	d.
.....	1	10	54	2	13	4	—	—	—	—
.....	1	9	75	2	11	11	—	—	—	—
.....	1	9	49	2	11	6	—	—	—	—
.....	1	11	33	2	14	9	—	—	—	—
.....	1	12	36	2	16	7	1 3	1 10	0 6	—
.....	1	4	90	2	3	6	-6 49	-11 3	-4 10	-7 52
									-13 1	-5 4

Viewing the results broadly, the first point that arrests attention is the very slight difference between the mean figures for the early and late ploughed fallows. Accepting 35s. per ton as an average price for hay in this district, the gross money value of the extra yield on the early fallows—1ewt. 71lbs.—works out at a shade under 3s. per acre. If we exclude for the moment Plot 6, which is ploughed only 4in. deep, and compare the mean yield from the early fallows with the late fallowed plot that is given a 7-in. furrow, we find that the returns from the September ploughing are 2cwt. 11lbs. per acre better than those from the winter-fallowed plots. The difference in this instance, on the same basis of computation, is worth approximately 3s. 8d. per acre. This result is contrary to all expectations, and is admittedly difficult to understand in view of the universal experience in favor of early fallowing. An examination of the results of each year does not simplify matters, for it will be observed that in three out of the four seasons Plot No. 5 has given the highest yield in the whole field. It is true that in 1913, which was a very backward season, the seeding rains being delayed till August, the early ploughing showed to advantage; but in 1914, the driest season on record, and again in 1915, on land that lay fallow during 1914, we find the September ploughed plot at the top of the list. Moreover, in 1915, we notice that even the late fallow that is ploughed 4in. deep gives a higher yield than three out of the four early fallowed plots, despite the 1914 drought. The scarcity of rain during the summer of 1914 no doubt nullified to a large extent the water-conserving effect of good fallow, and thus tended to reduce them all to one level in regard to moisture content; but even so, it comes a surprise to find the returns from the late ploughings in excess of those derived from Plots 1 to 4. The influence of a phenomenal thunder-

storm (1.82in.) in February, 1914, on the fallows was very marked. The late fallows harvested this season were then stubble plots, and of course shared in the downpour; but when we remember that the February flood was followed by practically 13 months of drought, it is hardly conceivable that this circumstance would appreciably affect the 1915 harvest. Probably the rough, knobby condition of the late fallows helped them through the wet winter of this season, and checked the formation of hard crust, whereas the thoroughly worked early fallows, being finer in the tilth, tended to melt down and set hard in the dry spring. The most that can be stated in explanation, however, is that the experiments are too short-lived at present to furnish reliable data. This implies that it is considered probable that at the end of 10 or 15 years the present relative position of the plots will be changed, and that the anomalous results so far obtained will give place to others that accord more harmoniously with the generally accepted views on the question of early versus late fallowing.

If we pause for a moment to examine the relative yields and their gross values, we will discover that the deeply ploughed late fallow has exceeded all others; the skim-ploughed early fallow is a good second, a narrow margin of 115lbs. per acre separating the two plots. The remainder of the early fallows have yielded within 4s. or 5s. of the gross return of the top plot; but the late ploughed 4-in. fallow is inferior to the extent of more than twice that amount.

Now, let us compare the results on an economic footing. It is quite clear from the above table of comparative values that when the costs of tillage are debited against the plots, the order of merit is considerably modified. We find that the third plot, which is typical of the general practice on the College Farm, displaces the late 7-in. fallow. No. 3 receives the least cultivation of all, being ploughed and subsequently cultivated three or four times, as needed; yet the net value of the produce is worth about 1s. 7d. per acre more than that of any other class of fallow under trial. The late ploughed 7-in. fallow comes second, thus beating three out of four of the early fallows. It should be mentioned, however, that the all-round charge of 7s. per acre for 7-in. ploughing has been applied to this plot, as well as to the early fallowings. In some years this might be quite a fair and reasonable thing to do; but, on the other hand, in dry years the 7-in. spring ploughing would certainly be more expensive than winter ploughing at an equal depth, and the difference in cost would probably be greater on the average than the extra net value over and above that obtained from Plot 4. The shallow fallow is still the least profitable, notwithstanding the fact that only 14s. 2d. is deducted for expenses. The

rolled (No. 1) and harrowed (No. 2) Plots are intermediate in position between Plots 6 and 4.

In summary, we would say that the net results gained so far tend towards the view that the deeply ploughed winter fallow, adequately cultivated to keep weeds down and check loss by evaporation, is the most remunerative of the systems tested. The late ploughed deep fallow is clearly preferable to the 4-in. ploughing in September, and also to all the early fallows except the one that receives ordinary working during the summer. From the manner in which the comparative figures have been tabulated, it is a very simple matter for anyone to see at a glance the relative merits of the different systems in terms of yield, gross values, and net values.

(To be continued.)

AGRICULTURAL EXPERIMENTS.—REPORT FOR YEAR 1915-1916.

[By W. J. SPAFFORD, Superintendent of Experimental Work.]

EXPERIMENTS WITH POTATOES.

Conducted by Messrs. POPE Bros., of Mount Barker.

For the last five consecutive years Messrs. Pope Bros., of Mount Barker, have been conducting experiments dealing with the manuring of potatoes, in conjunction with the Department of Agriculture. As was pointed out in the last report on these plots (*Journal of Agriculture*, September, 1915) the manuring followed in 1911 was not continued, so the results obtained in that year cannot be used with the results for the last four years, during which time the fertilising has been identical for each year. The treatment of the soil is quite similar for all plots, and the same variety of potatoes is used. The following table shows clearly what the manuring of these plots has been:—

TABLE I.—Showing Manuring of Potato Plots at Mount Barker, 1912-1915.

Plot.	Fertilisers per Acre.
.....	No manure.
.....	15 tons farmyard manure, 2cwt. superphosphate.
.....	15 tons farmyard manure.
.....	4cwt. superphosphate, 2cwt. dried blood.
.....	4cwt. superphosphate, 2cwt. dried blood, 1cwt. sulphate of potash.
.....	8cwt. superphosphate.
.....	8cwt. basic slag.

The plots on which these manures have been applied are all one acre in area, with the exception of Nos. 2 and 2A, which are each half acre. In all years only a variety of known suitability to the district has been grown on the plots.

Every year Messrs. Pope Bros. supply a report on the plots, and the reports for the previous years were shown in the last report on these experiments already referred to. For this year they say—"The plots had little chance of giving good yields, as very little rain fell between the times of planting and digging; in fact, plots 7 and 8 (seed tests) being the last planted did not have enough moisture to germinate the setts, and so they were a failure. We are certain much better results would have been obtained had we received more rain after planting, or even more rains in the spring preceding planting. All plots were planted in the third week of December, 1915, and dug by the last week of May, 1916."

In the table below will be found the yields of potatoes obtained from these variously manured plots for the last four years, together with the average yields for that period:—

TABLE II.—*Showing Yields of Potatoes with Various Manures for the Years 1912-1915.*

Plot—	1.	2.	2A.	3.
Manuring per Acre.	No Manure.	15 Tons Farmyard Manure, 2cwt. Superphosphate.	15 Tons Farmyard Manure.	4cwt. Superphosphate, 2cwt. Dried Blood
	T. C. Q.	T. C. Q.	T. C. Q.	T. C. Q.
1912-13.....	7 1 2	12 17 0	12 2 0	9 3 2
1913-14.....	0 17 3	1 12 2	1 12 2	1 17 2
1914-15.....	1 8 0	3 7 2	2 17 2	2 18 3
1915-16.....	2 0 0	2 0 0	1 8 3	3 2 2
Means for 4 years ..	2 16 3	4 19 1	4 10 1	4 5 2

Plot—	4.	5.	6.
Manuring per Acre.	4cwt. Superphosphate, 2cwt. Dried Blood, 1cwt. Sulphate of Potash.	8 cwt. Superphosphate.	8 cwt. Basic Slag.
	T. C. Q.	T. C. Q.	T. C. Q.
1912-13.....	9 2 0	9 4 0	7 10 0
1913-14.....	2 0 0	1 17 2	1 1 3
1914-15.....	2 18 1	3 2 3	2 16 1
1915-16.....	3 7 2	3 12 0	2 15 0
Means for 4 years ..	4 7 0	4 9 0	3 10 3

The next table will show the increase in the yields for the various plots over and above the results of the plot planted without manure.

TABLE III.—*Showing Average Increased Yield of Manured Plots over Unmanured Plot for the Period 1912-1915.*

Plot.	Fertilisers per Acre.	Average Increased Yield, 1912-1915.		
		T.	C.	Q.
1	No manure			
2	15 tons farmyard manure, 2cwts. superphosphate ..	2	2	2
2a	15 tons farmyard manure	1	13	2
3	4cwts. superphosphate, 2cwts. dried blood	1	8	3
4	4cwts. superphosphate, 2cwts. dried blood, 1cwt. sulphate of potash ..	1	10	1
5	8cwts. superphosphate	1	12	1
6	8cwts. basic slag	0	14	0

SEED TESTS.

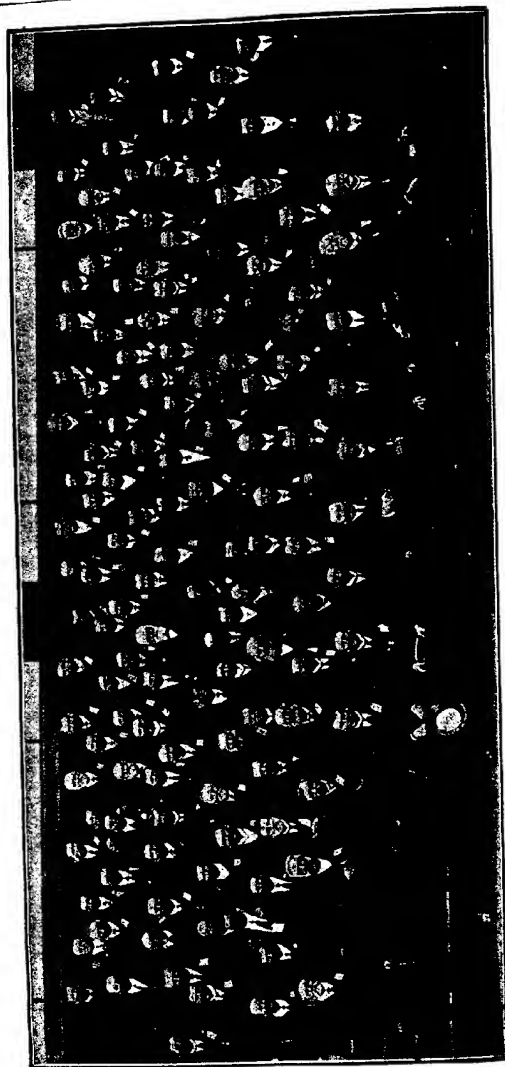
Besides these manurial tests with potatoes there have also been conducted a series of experiments dealing with various treatments of the seed—(a) comparing boxed seed with unboxed seed; and (b) comparing large uncut seed with small seed. The plots testing boxed seed were discontinued on the advice of Messrs. Pope Bros., as being a very expensive treatment not likely to be undertaken, unless the increased yield obtained as a result of the extra work was very great; that this increase did by no means compensate for the expense of boxes and the extra work that boxing entailed is easily seen by a glance at the results obtained for the period 1912-1914, and shown in last year's report. Small seed was again tested against large seed, and the yields for the last four years are to be found in the table below.

TABLE IV.—*Showing Results Obtained from using Small and Large Seed Potatoes, 1912-1915.*

Plot.	Seed.	1912-1913.	1913-1914.	1914-1915.	1915-1916.	Means for 4 Years.	
		T. C. Q.	T. C. Q.	T. C. Q.	T. C. Q.	T. C. Q.	T. C. Q.
7	Small..	4 3 0	0 17 3	2 18 3	Failure	2	0 0
8	Large..	4 15 0	1 1 1	2 9 3	Failure	2	1 2

The failure of these plots in 1915-1916 was due, as has already been shown, to a very bad germination through the lack of moisture.

For the years 1912-1914 the plots were dressed with 5cwts. basic slag, 2cwts. dried blood, and 1cwt. sulphate of potash to the acre, but in the season 1915-1916 no sulphate of potash was used, although the other fertilisers remained the same.



some of the Delegates, and Officers of the Department of Agriculture, who attended the 27th Annual Congress of the Agricultural Bureau, September, 1916.

W. S. Smith, (Photo.)

THE AGRICULTURAL BUREAU.

THE TWENTY-SEVENTH ANNUAL CONGRESS.

OPENED BY THE GOVERNOR.

The Twenty-seventh Annual Congress of the Agricultural Bureau was opened in Osborne Hall, Gouger Street, Adelaide, on Monday, Tuesday, and Wednesday, September 4th, 5th, and 6th.

DELEGATES.

During the sittings the following delegates attended:—Messrs. J. P. Richardson (Angaston), E. S. Matthews (Angaston), T. O'Donohue (Amyton), T. Griffin (Amyton), John Welch (Arthurton), T. H. Howlett (Arthurton), Wm. Mugford (Beaufort), Bruce Sampson (Beaufort), W. Cummings (Belalie North), A. H. Warner (Belalie North), E. G. Mitton (Berri), F. R. Arndt (Berri), E. C. Deland (Blyth), F. Wiltshire (Blyth), R. F. Mayford (Bookpurnong East), V. V. Crase (Bookpurnong East), Wm. Michael (Booleroo Centre), G. Ashby (Booleroo Centre), H. S. Green (Borrika), J. B. Tonkin (Borrika), J. J. Houser (Brentwood), W. Alderman (Brentwood), J. Travers (Bundaleer Springs), J. Lawrie (Bundaleer Springs), L. E. Simon (Bute), R. Barr, jun. (Butler), A. J. Hughes (Butler), A. F. Dempsey (Canowie Belt), G. A. Noll (Canowie Belt), W. T. Brown (Carrieton), C. T. Fisher (Carrieton), F. J. Annear (Carrow), A. Habib (Carrow), C. Ricks (Cherry Gardens), S. W. Chapman (Cherry Gardens), A. H. Wilkins (Clanfield), W. A. Moar (Clanfield), M. L. Nolan (Clare), R. E. Hunter (Clare), P. H. Knappstein (Clare), A. Phelps (Clarendon), L. Spencer (Clarendon), John Gray (Claypan Bore), Samuel Hill (Claypan Bore), E. H. Whitehead (Colton), Robert Hill (Colton), R. Upton, sen. (Coomandook), W. Nunnis (Coomandook), N. Lillecrapp (Coomooroo), W. Robertson (Coomooroo), J. J. Cronin (Coonalpyn), F. J. Tregenza (Coonalpyn), H. H. Lindo (Cradock), W. J. Venning (Crystal Brook), H. T. Noske (Cygnet River), J. E. Lecky (Davenport), A. O. Dawkins (Elbow Hill), F. H. G. Pfitzner (Frances), S. Meehan (Frances), E. Morris (Freeling), J. A. Mattiske, sen. (Freeling), A. J. Bray (Gawler River), A. W. Roediger (Gawler River), S. Eyre (Georgetown), M. J. McAuley (Georgetown), L. Prouse (Geranium), D. L. Lithgow (Geranium), J. H. Sargeant (Gladstone), W. Odgers (Gladstone), J. T. Halliday (Glencoe), G. F. Ferguson (Glencoe), E. S. Stephenson (Goode), Monfries (Gumeracha), Nosworthy (Gume-

racha), C. Russell (Halidon), L. Rosser (Halidon), B. Wundersitz (Hartley), D. Clark (Hartley), J. J. Heuschke (Hookina), G. Heuschke (Hookina), H. T. Martin (Inman Valley), H. J. Jagger (Inman Valley), Wm. Coats (Iron Bank), Wm. Slater (Iron Bank), D. S. Heaslip (Julia), W. H. Neal (Julia), Robert Correll (Kadina), Robert Truscott (Kadina), H. G. Pym (Kamantoo), R. W. Rolland (Kamantoo), T. Cooley (Ki Ki), L. Angus (Ki Ki), Fred Foord (Kingston-on-Murray), J. Wetherall (Kingston-on-Murray), E. O. Dahl (Koonibba), J. S. Foggo (Koonibba), V. W. Gardner (Koppio), G. B. Gardner (Koppio), G. H. Hahn (Kybybolite), A. R. Scholz (Kybybolite), E. J. Trowbridge (Lameroo), G. S. Hayman (Lameroo), P. A. H. Thiele (Loxton), W. H. Mengersen (Loxton), E. G. Blesing (Laura), P. T. Bowker (Laura), W. H. Lloyd (Leighton), R. J. C. Flower (Leighton), J. McInnes (Lucindale), W. M. Seeker (Lucindale), J. S. Hammat (Lyndoch), H. C. Williams (MacGillivray), E. G. Jarrett (Maitland), A. V. Nairn (Mallala), H. Catt (Mallala), A. G. Burton (Mangalo), E. Hannaford (Mantung), L. Pearce (Mantung), J. Philpot (Meadows), C. W. Ness (Milang), W. E. Richards (Milang), J. B. Mitchell (Millicent), I. Anger (Miltalie), P. J. McKeehen (Miltalie), O. P. L. Payne (Mindarie), J. S. Johnston (Mindarie), E. Correll (Minlaton), A. P. Braendler (Monarto South), C. F. Altmann (Monarto South), A. B. Ferguson (Moonta), W. J. Brinkworth (Moonta), W. Toop (Morehard), Geo. Collins (Morehard), R. Wohling (Morgan), C. A. R. Wohling (Morgan), A. C. Pocock (Morphett Vale), A. F. Furniss (Morphett Vale), B. Stephenson (Mount Barker), F. Simper (Mount Barker), A. A. Jeffries (Mount Bryan), C. W. Gare (Mount Bryan East), Jas. Doyle (Mount Bryan East), R. P. Pritchard (Mount Gambier), H. T. Myers (Mount Hope), John Colbert (Mount Hope), John McIntosh (Mount Remarkable), Wm. Smith, jun. (Mount Remarkable), J. Fletcher (Murray Bridge), R. S. Bell (Murray Bridge), Herbert Hill (Mypolonga), A. G. Collis (Mypolonga), C. Sampson (Mypolonga), M. McGuinness (Mypolonga), G. C. Gurr (Myrla), F. G. Williams (McNamara Bore), H. Saunders (McNamara Bore), F. J. Sutton (Nantawarra), W. Smith (Nantawarra), S. H. Schinckel (Naracoorte), W. H. Smith (Naracoorte), S. Bottrill (Narrung), H. Bowyer (Narrung), J. Bald (Nethererton), C. M. Wilkin (Nethererton), W. H. Richards (North Booborowie), A. V. Simpson (North Booborowie), E. W. Kelley (Northfield), W. J. Dall (Northfield), M. J. Noylan (Orroroo), J. McNaughton (Orroroo), M. Shannon (Parilla), A. Inkster (Parilla Well), J. Ferguson (Parilla Well), F. W. Gravestock (Parrakie), T. R. Brinkworth (Paskeville), Chas. S. Lee (Paskeville), P. H. Kilsby (Penola), H. Ricketts (Penola), R. D. Goodridge

(Pine Forest), I. Edwards (Pine Forest), P. J. Edwards (Pinnaroo), P. H. Jones (Pinnaroo), W. R. Whittaker (Port Broughton), J. J. Vanstone (Port Broughton), W. Squires (Port Elliot), H. B. Welch (Port Elliot), A. P. Blesing (Port Germein), J. K. Deer (Port Germein), John Eagle (Port Pirie), A. M. Lawrie (Port Pirie), R. Thompson (Quorn), Jas. Brewster (Quorn), F. G. Rogers (Rameo), H. Green (Rameo), H. Waters (Renmark), H. D. Howis (Renmark), Robert H. Cooper (Riverton), Ern. A. Gray (Riverton), L. E. Cowley (Roberts and Verran), F. H. Wolf (Rosenthal), H. F. Mugge (Rosenthal), M. A. McCabe (Rosy Pine), W. Townsend (Rosy Pine), W. J. McNeol (Salisbury), F. C. Fleet (Salisbury), G. E. Barber (Salt Creek), R. H. Hornhardt (Salt Creek), A. Grant (Sandalwood), W. Willoughby (Sandalwood), T. Partridge (Sherlock), A. G. Kubank (Stirling's Well), J. Murray (Stockport), G. Nairn (Stockport), T. D. Finney (Strathalbyn), W. H. Cumming (Strathalbyn), A. A. Fisher (Tatiara), Thos. Stanton (Tatiara), J. Donaldson (Tintinara), T. Stead (Tintinara), H. W. Kenner (Two Wells), G. M. Gordon (Two Wells), E. Jaeschke, sen. (Waikerie), J. C. Rowe (Waikerie), G. Growden (Wareowie), F. N. Hamp (Watervale), P. Burns, jun. (Wepowie), S. McMahon (Wepowie), G. F. Jenkins (Whyte-Yareowie), F. N. Lock (Whyte-Yareowie), W. J. Tylor (Wilkawatt), A. B. Neville (Wilkawatt), S. G. McCallum (Willowie), W. P. Foulis (Willowie), F. Zimmermann (Wilmington), A. J. G. Benier (Wilmington), E. B. Pitman (Wirrabara), E. J. Stephens (Wirrabara), H. H. Exton (Wirrega), W. R. Fairweather (Wirrega), C. E. H. Stone (Wollowa), J. T. Simper (Wollowa), L. Good (Woodleigh), E. T. Smith (Woodleigh), A. S. Hughes (Woodside), W. Rollbusch (Woodside), A. Hood (Wynarka), W. H. Richardson (Wynarka), J. S. Colbert (Yabmana), S. H. Pearce (Yadnarie), H. S. Bauer (Yadnarie), G. E. Opitz (Yaninee), J. Lund (Yaninee), H. Glover (Yeelanna), W. D. Wemyss (Yeelanna), A. Jamieson (Yongala Vale), T. H. Battersly (Yongala Vale), E. F. J. Altschwager (Tantanoola), D. Beaton (Tantanoola), David Kelly (Mintaro), E. A. Scarfe (Mintaro), H. Harrison (Yacka), E. Jenkins (Yacka), Wm. Henning (Pompoota), Wm. Harrison (Pompoota), S. Trigg (Cummins), I. Sahey (Cummins).

THE OPENING SESSION.

Congress was opened at 8 p.m. on Monday, September 4th, by His Excellency the Governor (Sir Henry Galway). Mr. F. Coleman (Chairman of the Advisory Board) presided, and there were also present on the platform the Minister of Agriculture (Hon. C. Goode), Mr. G. R. Laffer, M.P., Professor Perkins (Director of Agriculture), Professor Osborn, Messrs. W. J. Colebatch (Principal of Roseworthy

College), G. Jeffrey (member of Advisory Board), Henshaw Jackson (Wool Instructor of the School of Mines), D. F. Laurie (Poultry Expert), W. J. Spafford (Superintendent of Experimental Work), S. McIntosh (Director of Irrigation), C. J. Tuekwell (member of Advisory Board), A. M. Dawkins (member of Advisory Board), G. G. Nicholls (Secretary of Wheat Board), P. H. Suter (Dairy Expert), H. E. Laffer (State Viticulturist), W. L. Summers (Secretary of the Minister of Agriculture), T. H. Williams (Chief Stock Inspector), J. Miller (member of Advisory Board), and H. J. Finnis (Acting Secretary Advisory Board).

The Chairman welcomed His Excellency on behalf of the Advisory Board, and asked him to declare the Conference open.

THE GOVERNOR'S ADDRESS.

His Excellency said: Two years ago I had the pleasure of presiding at the annual meeting of the Agricultural Bureau. When that meeting took place we had been a month at war, and we all lived in hopes that the struggle would not be a long one. However, here we meet in the third year of the greatest war in history, and nobody can even now attempt to predict when the end will come. I do not propose to dwell for long this evening on the one topic which has held possession of our thoughts for the last two years. I would say, however, that the prospects of the Allies were never brighter than they are to-day. We have every reason to feel confident that the fortunes of Germany are very much on the down grade, and that, in God's good time, the champions of everything that is ignoble, dishonourable, and barbarous will be crushed, and the promoters of this hideous war arraigned before the tribunal of those nations who count freedom, honour, liberty, and justice as the *vade mecum* of good government. No man possessing high ideals can have any pity for a nation which has allowed itself, like a herd of cattle, to be driven blindly by the Prussian military clique which governs Germany, and of which clique the Kaiser is the paramount leader. The Kaiser stands accused and condemned in the eyes of the civilised world. He has inspired his commanders to follow blindly in his wake of infamy and brutality, and one wonders how Germany can ever hope to be again received on friendly terms by the Allied nations. Germany's wickedness is only equalled by her stupidity. By her actions she has forfeited all human sympathy and respect, and has placed an indelible stain on her once good name.

REPATRIATION.

Let us now turn from the tragedy of war to the situation here and to our prospects in the near future. I take it that the study

of the skies is given a great deal of attention by you gentlemen. Well, this year you have had almost too much of a good thing where the rainfall is concerned; and, although there are unfortunately portions of the pastoral areas which have not had as much rain as they require, generally speaking, the farmers and pastoralists are, I should say, in better heart than they have been for a long time, although the farmers had not much to complain of last year. However, they deserved all they got, and I trust that their patience and energies may be again rewarded this year. As to the future, we are chiefly concerned with the repatriation of our returned soldiers. The task, in that connection, is necessarily going to be a very difficult one—but the sooner we set to work to formulate a workable scheme, the better prepared we shall be to make a success of it. Three weeks ago I presided at a meeting at which was launched the Repatriation Fund, and I have every reason to think that it will not be for want of honest endeavor if a very difficult problem is not satisfactorily solved in this State. There is no doubt that the placing of returned soldiers on the land is going to prove a very expensive undertaking. At a conference held in February last, at which were present Government representatives of the Commonwealth and the several States, it was calculated that it would take £23,000,000 to settle 42,000 men on the land in three years—that is, at the rate of over £500 a man. Repatriation, however, does not only mean placing men on the land. It also aims at re-establishing our returned soldiers in civil life, and in assisting them to take up various trades and industries. I have on two occasions visited the Government Training and Experimental Farm at Pompoota, on the left bank of the River Murray, and it struck me that the project was an excellent one, and one which would confer great benefits upon those men who had the advantage of being trained at Pompoota. It is not every man who has the inclination to take up farming—and not all men are suited for such a venture. It is very difficult for any man to take up any particular line in life, and make a success of it, unless his heart is in the work. Soldiers are particularly handicapped in this connection. After the crash and bustle of active service, it is most difficult for a man to settle down to the ordinary avocations of life, and to take on contentedly the monotony of the daily task. This particularly applies in a country like Australia, where the areas are large and the population sparse. Loneliness is a feature of life which often strikes one as one travels through the back blocks of the State, where you see single habitations dotted sparingly about, miles and miles apart. The remedy for such a state of affairs is population—and no doubt in settling our fighting men on the land we shall place them in certain

numbers on adjoining properties, and intersperse among them experienced settlers. In any case I take it that only those men who are suitable will be granted plots of land.

ROSEWORTHY COLLEGE.

I am in hopes that when the war is over more advantage will be taken of the Agricultural College at Roseworthy, an excellent and well-run institution. A young man who has done a three years' course at Roseworthy only requires a small capital to become a very successful farmer. I have visited Roseworthy twice, and on each occasion I was very much impressed with the sound methods of teaching adopted there. I have also visited the Victorian Government Agricultural College at Dookie, where also the most modern methods of instruction are in vogue. The Dookie College is handicapped by being too much out of the way. I feel sure that greater use would be derived from that institution if it were, as Roseworthy is, near the State capital.

POST-WAR TRADE.

Settling our returned soldiers on the land, or in some other walk of life, is no doubt the first after-war duty devolving on the several Governments. What is almost equally important is the question of after-war trade. Germany is already making tremendous preparations to flood the world with her goods, as soon as peace is declared. Her agents are purchasing raw material in many neutral countries, especially in South America, and on that continent exhibitions of German goods are being held. Looking ahead and preparing has been the secret of Germany's success in the past. That country achieved her preliminary successes in the war owing to her being prepared, whilst her adversaries were not. The first year and a half of this war was a startling example of the dangers attending unreadiness. It is perfectly clear that Germany is making great efforts to prepare a plan of campaign to wage a commercial war after the war is over. It is vitally necessary that we, on our part, should make similar preparations. There never was a time when it was so imperative, so vitally necessary, for British business men to watch commercial developments with the greatest attention. It may be news to you to learn that the publication of reports by British Consular officers has been suspended during the war, the reason being on the grounds of economy. Truth is indeed stranger than fiction. Those reports would be of the greatest value at the present time, if only for the purpose of indicating openings for British trade and in drawing attention to the activities of our competitors. What is wanted is an All-British Consular Service, under which salaried Vice-

Consuls would be appointed at all places of sufficient importance. These officers would devote their time exclusively to the duties of their office. They would not be traders, but men selected by their suitability for the work of trade representatives. If we had 500 such officers, at an average salary of £300 a year, it would amount to £150,000—surely an improvement on the present system, where there are 600 unsalaried Vice-Consuls, the majority of whom are natives of the country in which they are appointed.

A NEW SPIRIT NECESSARY.

There is no doubt that, after the war there will be an immensely increased trade throughout the world, and we must do all we can now to acquire what were once enemy's markets. What is wanted is a new spirit in our systems. If we are to improve, it is essential that the employer and the employed should come together for the purpose of mutual protection. In that way alone can we lay the sure foundation of preparedness. Capital and labor must come to some working arrangement, and recognise their joint responsibility for the welfare of the people, if we are to hold our own in international competition. Some means must be found to enlighten the working men as to the imminence and reality of the commercial peril brought about by the war. The Paris Economic Conference laid down the foundations on which the Allied Governments would act in commercial matters after the war. The special measures to be devised will vary with the different industries and localities; but all measures must be considered and applied in the same spirit in which the war is being fought. (Applause.)

On the motion of Mr. A. M. Dawkins, seconded by Mr. G. R. Laffer, M.P., a hearty vote of thanks was accorded His Excellency for his attendance at the Congress and his opening address. His Excellency briefly replied.

MINISTER OF AGRICULTURE'S SPEECH.

The Minister of Agriculture said that it was a proud occasion for him to stand there as head of that splendid organisation, the Agricultural Bureau. He had had the honor of being secretary and also president of one of its branches, and had also been a delegate to the annual congress. He had now the greater honor of being present as the Ministerial head of the Department and delivering an address. It was a coincidence that the last time he appeared in Congress one of the suggestions was that the membership should be unlimited. Before that it had been restricted to a certain number. His friend, the present Chairman of the Board, seconded the motion which he had moved, but it was defeated. It was, however, carried at a later

Congress, and they could now have a branch wherever they wished and as many members as they cared to elect in the branch. It had been a good thing for South Australia, and, if so, they could not have too many farmers and agriculturists in it. The same organisation existed not only in the agricultural areas, but in the irrigation areas, and it promised well for the future of agriculture and the irrigation industry. Whilst sojourning in South Australia His Excellency had seen the extremes in regard to the seasons. They had passed through the worst drought on record since His Excellency had arrived, and he hoped they would not have a repetition of that experience. He did not think it probable that the Governor would live to see such a thing again, because it was not within the knowledge of white men to have such a visitation. His Excellency had also seen the wettest winter on record. They had had a most bountiful harvest last year, and it would, they hoped, be equalled, if not excelled, in the present year. After such a drought, they could stand two good seasons.

WAR OBLIGATIONS.

His Excellency had referred to the awful war and the cloud that still hung over them. It was their first duty to win the war. They could not predict when the end would come, but they could predict what it would be. It would be the triumph of right over wrong and of right over might, so that Prussian militarism would no longer threaten the world. They would not be content with a decision which would only last for a little while. If the power of militarism were not utterly broken, they would have to face again, before many years, a similar world's catastrophe. The sword therefore would not be sheathed until the international criminal had been put in his place.

THE WHEAT SCHEME.

The farmers had a duty to perform to the nation. If their wheat must wait because the needs of the Admiralty made it practically impossible to secure freight, then it must stay in the stacks. The war had to be won, and everything else was a secondary consideration. (Hear, hear.) The Government had many difficult problems to face arising out of the war. The great wheat scheme had been an outcome of the war, and he assured the Congress that it was not entered into from any political motive, but had been looked at purely from a business point of view. It had been found at the outset that it would be practically impossible for private individuals to secure freight, and that if they were able to get any it would be at such a cost as would give the farmers little or no return. In the Argentine that day they were paying 170s., but they could afford to pay it

there, because the distance from the London market was much less than in the case of Australia. Farmers at this end of the world could not have afforded to pay anything like it. And if it had not been for the scheme they would have received much less than had been paid, not taking into consideration the extra 6d. He felt that the scheme had justified itself, and he would leave it at that.

BULK HANDLING OF WHEAT.

With regard to the bulk handling of wheat, he would say that His Excellency had referred to the organisation of the industry and doing the utmost to secure the best results from the soil, and he thought that bulk handling would give greater economy in dealing with their staple product than was the case at present. If that idea were wrong, they wanted to know it, and he would give every opportunity for discussion. He hoped when the matter came before them they would consider it carefully and not allow their good judgment to be affected by anything in the way of political prejudice. The system should be judged on its merits. If it could be shown that the bag system was the best thing for them in handling wheat, let them use bags, but if that were not so, let them adopt bulk handling. It should, in that event, not be a question of whether the time was opportune or of what the scheme was going to cost. Business men did not hesitate to pull down factories and scrap machinery in favor of better and newer ideas, and farmers should do their best to arrive at a conclusion on the same basis. He asked them to have an open mind on the subject, and, until they had heard all that would be explained to them, not to sign petitions that were being circulated for political purposes.

AFTERMATH OF THE WAR.

Briefly, he wished to direct their attention to what they must be prepared to do to meet the aftermath of the war. There were soldiers coming back in a more or less disabled condition. Their duty was to be prepared to receive them and find them a place in their midst where they could secure a livelihood in conditions which were congenial to them. South Australia was the first to establish a training farm in connection with the irrigation areas. The Governor had referred to the excellent work at the Pompoota Settlement for returned soldiers. The Government had recognised that there would be difficulties to contend with there, but they were prepared to face their responsibilities and the difficulties, and they went through with it. He hoped young men would not think their duty to their country was finished because they had gone to the front and fought, but that they would carry the same spirit to win through in what-

ever sphere they might afterwards be placed. Excellent work was being done on the Government training farm at Pompoota to fit the returned soldiers for an agricultural career, and he felt sure that when those young men went out and took up land for themselves they would receive the sympathetic assistance of those whose farms were close to them, and who, for good reasons, had not been able to go to the front. The Government would do their share in providing occupation for those who came back from the war, and, if the farmers put their land to greater productive capacity, they would be serving their country in the same spirit as the soldiers who had gone to the front.

FOSTERING RURAL INDUSTRIES.

The Government were determined by every means in their power to foster the rural industries, for they recognised that it was only by closer settlement and greater development of the land already under occupation, and that which was to be occupied, that they could increase the productiveness of the land and that industries might be established in other directions. Science would be brought to the aid of the farmer. It was true that the farmers were the backbone of the country, but he wished them to understand that the backbone without the limbs would be of very little service. As tillers of the soil they were dependent upon other industries, and the man who dug from the bowels of the earth the coal and the iron ore was a producer of wheat in the economic sense, as he made possible the means of tilling the ground that the wheat might be sown. It was by closer settlement, the closer application of science, the utilisation of the best methods of cultivation, the setting aside of slovenliness, and the putting of first class, thorough work into the farms that they would make the land a means of producing a greater amount of wealth than it did to-day, and also enable a greater amount of wealth to be shared by the whole community. The Government were prepared to push closer settlement to its utmost capacity. The Mount Remarkable Estate had recently been purchased, and would be set aside for the settlement of soldiers, with a training farm fitted out under the direction of Professor Perkins, under a scheme which would include among other things instruction in cereal production and live stock raising. A capable manager had been secured, and they would be in a position within the next week or two to receive soldier trainees at the farm. The most up-to-date methods of scientific agriculture would there receive attention.

EXPERIMENTAL WORK.

Agricultural tractors had been secured, and were being given a trial with a view of ascertaining whether they were cheaper than

horse-drawn implements. He thought that was an experiment the Government were wise to undertake. If it proved to be more costly than horse traction, the maker would have to develop it until it became less costly, or else it would be put aside altogether. It was, however, the intention of the Government to see how far the cost of agriculture could be lessened by the use of power machinery for agricultural purposes. In connection with wheat production, no effort would be spared in the direction of experimental work with a view to the introduction of better varieties, and the selection of those which would give the greatest yields under different climatic conditions. That would not be confined to wheat, but would apply also to oats. He had authorised that at Tailem Bend. At the conference at Tailem Bend some doubts were expressed as to the best oats to grow. They would have tests made in that and any other district where it was necessary.

STIMULATING THE DAIRYING INDUSTRY.

They hoped to stimulate greater activity in the dairying industry, which had been neglected in South Australia, and they proposed in connection with herds in the metropolitan area to initiate a scheme by means of which the progeny of some of the best cows in the State would be taken to a depot, reared, and made available to dairymen when they reached maturity. The scheme would be propounded in the course of the next few weeks. It was a shame that valuable young stock should be slaughtered, when they had such a dearth, not only of young stock, but in their dairy cattle and their flocks and herds generally. Whilst in Victoria recently he had discussed with the authorities there the methods in regard to the subsidising of silos, and he had the authority of Cabinet to institute a policy similar to that in Victoria in regard to the erection of fodder silos for the dairy farmers of South Australia. Farmers who made application would have advanced to them, on easy terms, money for the erection of those silos.

MIXED FARMING.

For the encouragement of mixed farming it was hoped to organise co-operative effort, and in connection with the soldiers' settlements at Mount Remarkable and Kangaroo Island, to have bacon and butter factories. It was desired to foster the pig-raising industry to the utmost possible extent, and in that relation the export trade would have to be developed. The pig increased and multiplied very quickly. When prices were high, people rushed into the industry, and when prices fell they rushed out again. They wanted to increase the consumption among their own people, and they hoped also

by the system of co-operative settlements and co-operative factories to establish an export trade overseas and supply some of the markets of the world from South Australia.

FRUIT GROWING.

In connection with fruit growing, there was room for great development. A visitor from France said that he saw more land uncultivated between Adelaide and Blackwood than he had seen in the whole of France. They had scope about Adelaide, in Kangaroo Island, and on the banks of the Murray for greater development, but it would have to keep pace to some extent with the population. They must progress in the eating of their own products, for by doing so they would be contributing to their own health, to the welfare of the man on the land, and the welfare of the whole community. In connection with Eyre's Peninsula Experimental Farm they hoped to lay out a model farm. The Director of Agriculture had planned that the land should be planted round with olive trees. The climate of the State lent itself to the production of olives and olive oil, and there was no reason why it should not be developed into a greater industry than it had been in the past.

IRRIGATION.

The Government policy in regard to irrigation was one of full steam ahead. They could not move too fast in that direction. They proposed to establish in connection with the irrigation settlement, a farm under the Director of Agriculture, where experiments could be carried out. One of the experiments to be tried would be maize growing. They should produce at least enough of that for home consumption, if not for export. They should not import from Queensland and New South Wales if they could produce it for themselves. The Government would go in for a vigorous policy in connection with all the rural industries.

CONCLUSION.

They had heard a great deal recently in connection with the rooting out of German names and of things made in Germany which they had been accustomed to use. He had nothing to say against that. Let them go. But if they were getting rid only of the German names and goods, and adhered to the German methods and principles, they were only getting rid of the husk and keeping the kernel. The doctrine which had imposed that war upon the world was that might should triumph over right, and the rights of the little nations and minorities might be disregarded, and also the doctrine that the end justified the means, which was one of the German fetishes, and though wrong in itself, it was hoped by that means to enhance Ger-

man power and German prestige. That was a damnable creed, and should be rooted out stock and branch. There were, however, many things in their organisation, and the application of science to industry, which they could learn from Germany. They were not going to become a great country by taking short cuts, or what they conceived to be short cuts, to the attainment of their destiny. Nations which took short cuts by wrongdoing to what they conceived to be their advantage, would find, as Germany had, that their scheming would bring them to a terrible end sooner or later. They must learn the lesson to do right because it was right regardless of consequences, and so they would become a great nation, or there was no power in democracy. (Applause.)

WORK OF THE BUREAU.

The Chairman said that there was no Congress last year and no show, and therefore the review he proposed to make was that of the Advisory Board for the past two years. First of all there was the question of the Chapman cornsack. They considered that a sack 23in. x 41in. when filled should be considered a legal sack. They appealed to the Federal Customs authorities on that point, but although they had the support of the Federal members, the Customs authorities insisted that the wheat and cornsack should not exceed 200lbs. in weight. A committee had been appointed to draft resolutions in regard to the effect of vermin upon sheep, especially in the South-East. The result was that a line had been drawn, and an infected area declared, and it had been provided that sheep in that area must be dipped and that an arsenical powder, poisonous dip, must be used on every occasion. While the question of an irrigation college on the Murray was deemed quite unnecessary, yet the need for instruction and guidance in all branches of agriculture, horticulture, and stock raising among the reclaimed areas of the Murray had very strongly appealed to them, and the Board had made recommendations that the Government should provide assistance to the settlers. The question of farming apprentices had engaged their attention, and they had recommended that something should be done in that direction. In regard to the destruction of noxious weeds and rabbits, nothing would be accomplished until a department was organised with an inspector who had power to enforce the regulations on the lines of the Stock and Brands Department. District councils were often the greatest offenders in regard to noxious weeds, and they would not take steps in regard to the noxious weeds growing on their own lands. The Board had suggested that a bonus should be offered for a shoot scorer, but that had had to stand over for the time being. It was imperative that

they should help the mallee settlers who were winning a new province for South Australia, and deserved every help. During the past year there had been seven conferences, and the experts and officers of the department had attended and provided a greater portion of the papers. If the conferences were to maintain their character, at any rate half the programme should be supplied by the Branches forming the conference. They had excellent officers, who had done most excellent work. He referred especially to the work of Mr. Henshaw Jackson (Wool Expert), who insisted on the farmers raising more sheep, and who instructed them how to raise them, how to feed them, and how to dispose of the produce. Mr. Jackson said that 93 per cent. of the wool which South Australia had sent to the market was comprised of consignments of less than 50 bales. Therefore it was the general farmer, the small sheep farmer, who supplied more than 90 per cent. of the wool in the State. Mr. Jackson said that it would pay better to feed hay to sheep than to sell it at 30s. or 35s. per ton. He deserved assistance. He was working single-handed, and he hoped his efforts would bear fruit before long. Mr. Nicholls, the Secretary, who was an excellent officer, was now engaged on the Wheat Board, and the work of the Advisory Board had fallen upon Mr. Finnis, who had carried out his duties admirably. During the year 18 new Branches had been opened, and there were now 190 Branches, with over 4,000 members. The work of the Hon. Secretaries of the different Branches had been excellent, for it must be remembered that they held a position which was not to be coveted. Over 365 young men, members of the Branches of the Agricultural Bureau, had left their farms and gone to the front. It had been a serious matter to some of the Branches, and one or more had been compelled to ask to go into recess until after the war. For the future he felt that, whether their destiny lay in the extension of their agricultural lands by reclaiming more mallee, or by increased cultivation of present holdings, they needed more grit, more determination, more hard work, and the resolution to extract as much as possible from the soil during the next few years to meet their heavy responsibilities. In South Australia the land not cultivated was 7.12 in excess of the other States. The State's wheat-growing area was not unlimited, and they must increase the cultivation in the areas under cultivation, grow more stock, fatten more sheep, grow more wheat by increasing the yield per acre, produce more butter from each cow, more eggs from each fowl, more fruit from the orchards and finer, in order that they might increase production, and so meet their heavy responsibilities as they came along. (Applause.)

(To be continued).

ADVISORY BOARD OF AGRICULTURE.

The usual monthly meeting of the Advisory Board was held on Wednesday, October 20th, there being present Messrs. F. Coleman (chair), G. R. Laffer, M.P., W. J. Colebatch, T. H. Williams, A. M. Dawkins, C. J. Tuckwell, J. Miller, and H. J. Finnis (Acting Secretary).

MILL PRODUCTS.

The Board decided to seek a report from the Chemistry Department on the feasibility of standardising mill products for sale.

ROADS.

A sub-committee, consisting of Messrs. Laffer, Dawkins, and the Acting Secretary was appointed to communicate with Branches of the Bureau with a view to ascertaining their opinions on the question of protecting roads from damage due to excessive loading, and other matters affecting roads legislation.

WOMEN'S COUNTRY CLUBS.

Arising out of a resolution received from the Hartley Branch, and a communication from a convention held under the auspices of the Farmers and Settlers' Association, the Board gave consideration to a suggestion from the Acting Secretary in relation to the formation of women's clubs in country centres throughout the State. The Acting Secretary expressed the view that it was desirable that women in country districts should be enabled to secure instruction in such subjects as home sanitation, home architecture, first aid, dietetics, hygiene, &c., in addition to poultry keeping, dairying, horticulture, etc. He recommended to the consideration of the Board a proposal for the formation of "Women's Country Clubs," and outlined a scheme with that end in view. It was decided to give further consideration to the proposal at a future meeting.

EXEMPTIONS FROM COMPULSORY SERVICE.

The Board endorsed a request from the Willowie Branch to the effect that farm laborers might be exempted from compulsory military service until after harvest, and referred the matter to the Minister of Agriculture.

BULK HANDLING OF WHEAT.

The opinion was expressed that every facility should be given Branches to discuss the question of handling wheat in bulk, but it

was undesirable that resolutions supporting or condemning the system should be submitted.

NEW BRANCHES.

Approval was given to the formation of a new Branch at Mundalla; 219 names were added to the rolls of existing Branches.

WHEAT STACKS.

Mr. Miller reported having noticed a considerable amount of waste around the wheat stacks in the north. It was decided to draw the attention of the Wheat Harvest Board to this matter, with the idea of ascertaining whether steps could be taken to prevent the waste.

CONFERENCE OF OWNERS OF DAIRY FACTORIES.

At the instance of Mr. C. J. Tuckwell, it was decided to take steps to ascertain the feelings of dairy factory managers on the question of holding a conference for the purpose of discussing matters of mutual interest.

MILK FEVER OR DROP AFTER CALVING.

[By F. E. PLACE, B.V.Sc., M.R.C.V.S., Government Veterinary Lecturer.]

Numerous inquiries from districts as widely separated as Mount Gambier, Pinnaroo, and Willaloo show that this disease is common in South Australia, and yet not generally recognised by cowkeepers. The name "milk fever" is unfortunate, as the milk has practically nothing to do with the symptoms, and so far from being a fever, the temperature is, as a rule, considerably below normal, so that the Devonshire name, "the drop," is more appropriate.

A typical case follows a course of this description:—The cow has her third, fourth, or later calf, and the birth is an easy one; sometimes help is rendered, but the ease with which the calf is delivered has an important bearing on the onset of an attack. The cow is usually in very good condition or improving, and as a rule is an easy-going, lymphatic beast.

Some hours after calving, varying from three to as many days, she may be noticed to be uneasy, lowing, and paddling with her hind feet.

and her eye is staring as if she had a bad headache, which is a fact. These early symptoms are often overlooked, the paddling is put down to her having recently calved, and the lowing and staring to nervousness for her calf.

A few hours later she is down and unable to rise, possibly moaning, and her head is swung round to her flank, losing consciousness, tossing herself about, and probably blowing up; bowels and bladder seem to suspend work, and after a day or two she dies or gradually comes round, in which case there is probably acute constipation and more or less stiffness or actual lameness persisting in one or other hind leg, and if she has been drenched she is probably coughing and discharging from the nose, and may develop the symptoms of pneumonia and die about a fortnight later. It will be noticed in this list of symptoms that the udder has not been mentioned. There is no need for it; the heat, pain, and distension that many people describe exist only in the imagination.

Now for the treatment; prevention will be touched on later. *Do not drench.* The cow is a patient beast, and in this disease a form of paralysis is creeping on, and what is poured into her mouth is as likely to go the wrong way as the right, hence the inflammation of the lungs, which kills so many. *Do not milk out.* Stripping the udder is one of the main causes of the collapse, and the best plan is to leave the milking business to the calf, or if he is unable to undertake it, only ease the udder during the first twenty-four hours.

As soon as the symptoms are distinguished, blow up the unstripped udder with air, quarter by quarter, with a milk fever apparatus if at hand, but a milk syphon or a quill on a bicycle pump will do equally well at a pinch, massaging the udder well as the air is blown in until it is firm and tense. As a rule it is not necessary to tie the teats, but if they are flabby and lax a broad tape may be tied round their base. Doubling them up is not required, and the tape should not be over tight nor left on too long.

It is necessary that all the apparatus should be quite clean; udder troubles that follow in some cases are due to neglect of this precaution. The air filter that is attached to the apparatus will not compensate for dirt in the tube. Swilling with cold water and then boiling is the best way of cleaning the gear. This should be done both before and after use.

After the operation prop the cow on her breast so that her weight is on her abdomen and udder, and make her as comfortable as possible. It is well to get her to pass urine by rubbing the bearing, and if the bowels are bound up, empty them with an enema. Shelter her from cold or heat, and if very uneasy, apply ice poultices or cold swabs round the base of the horns.

As a rule in as many hours as she has been down before treatment, in so many will she get up again, but it is not advisable to let too many elapse before commencing, and in some obstinate cases, and in others where the air has escaped too rapidly, the blowing up will have to be repeated to keep the udder tense. Do not hurry her up, but be ready with help when she begins to try, and when she is up let her have a bran mash and a little hay.

Do not be in a hurry to milk her out, but just make her udder comfortable. For a few days give her 10 drops of tincture nux vomica on her tongue three times a day, and she will come into full profit as usual.

Why has such simple treatment so good an effect, when in past times vigorous treatment such as bleeding, gallons of whisky, and potent drugs like strychnine, failed? Because the symptoms are the result of a mechanical interference with the circulation. The blood, which has been going to nourish the calf before birth, has to be diverted to the udder as it becomes functionally active, and the quick, easy parturition of the plethoric animal results in a back suction into the large veins of the abdomen, bringing about congestion in them, and depriving the intricate vessels of the brain of their share, hence the head symptoms, the drop in temperature, and the drop of paralysis, the sudden onset, and the equally rapid recovery because the air pressure regulates the circulation.

Prevention consists in keeping the cow in hard, healthy condition, giving her a fair rest between lactation periods of a month or so, letting her live hard and get plenty of exercise during gestation, and especially so for the weeks just before calving, keeping her bowels regular, preferably by diet, but if necessary by an occasional drench of $\frac{1}{2}$ lb. to 1 lb. of Epsom salts with an ounce of ginger in a quart of warm water.

Complications that arise, such as hoven when she is down, or pneumonia after getting up, or lameness, must be treated in the usual ways demanded by such diseases. Stab for hoven or put tar on the tongue, or both. For pneumonia, keep the temperature down with aconite and belladonna or small doses of 2-4 ozs. salts and rub liniment into the sides of the chest. For lameness give 10 drops tr. rhus. tox. twice a day and rub the quarter and leg well with liniment. One attack does not render a cow immune to another, but it is not usual for her to have a second unless her temperament is very conducive to an attack.

Simple though the treatment is, the preventive measures indicated are much more valuable.

DIPPING SHEEP.

The Chief Inspector of Stock (Mr. T. H. Williams) has supplied the following points for sheep owners:—

1. The Amending Stock Diseases Act of 1915 provides that all sheep in the electoral district of Alexandra, including Kangaroo Island, the district of Albert south of the railway line running from Tailm Bend to the Victorian border near Pinnaroo, and the district of Victoria, shall be dipped between the 1st day of September in every year and the end of January in the following year.

2. All sheep must be dipped in a poisonous powder dip as provided by proclamation under the said amending Act.

3. The instructions for mixing the dip are on every packet, and they must be strictly followed, if the object for which the sheep are dipped, *viz.*, the destruction of lice and ticks, is to be successful. Keep the dip at full strength.

4. Sheep must be kept in the bath not less than one minute.

5. Sheep infected with lice should be dipped twice within 14 days to thoroughly cleanse them.

6. Do not fail to muster and dip all stragglers on the holding.

7. The best time to dip sheep is when they have from four to six weeks' growth of wool on them.

8. Owners should examine the sheep frequently and satisfy themselves that they are free of vermin.

9. Wool from sheep free of vermin will bring top prices, while that from infected sheep will have deteriorated from 25 to 45 per cent.

10. Lice-infected lambs at five to six months old will not be as valuable by 50 per cent. as the clean animal.

11. Owners of small lines of sheep should club together and procure a portable dip.

12. Any further information required on this important matter can be obtained upon application to the Chief Inspector of Stock, Stock and Brands Department, Adelaide.

THE AGRICULTURAL OUTLOOK.

REPORT FOR THE MONTH OF SEPTEMBER.

Booborowie.—Weather.—The first three weeks of this month were very dry; hot days and strong drying winds were prevalent; the third week, on September 22nd and 23rd, splendid rains fell, and over 180 points were registered. Crops on stubble land are very poor, but should receive great benefit from the rain which fell. Natural Feed.—There is not much growth in the feed; the late winter and dry weather following immediately was very much against it. Stock are looking well and beginning to top up nicely. Miscellaneous.—Sheep farmers are experiencing some difficulty in obtaining shearers, so many having gone to the front.

Eyre's Peninsula.—Weather.—The first three weeks recorded fine, rather warm, and dry weather, shade temperatures reaching up to 90deg., and only four or five damp mornings were observed. Two splendid days' rain followed, registering 2½ in., and the last week has been cool with light showers and southerly breezes. North breezes were recorded on six days during the dry part of the month, and these checked crop growth somewhat, especially that of oats. Crops are now promising very well; some of the early varieties have completed flowering. Loose smut is showing rather plentifully. Charlock is becoming thick in the district, but is not much in evidence amongst the crops this year. Natural feed is good, and running to seed; the speargrass (*Astipa pubescens*) has made considerably the most growth. Pests.—Rabbits are multiplying quickly, and settlers are well at them with traps, etc. Cutworms are plentiful, and the recent dry spell gave the aphides an accepted opportunity to make inroads on the few local vegetable patches.

Turretfield.—Weather conditions during the first three weeks of September were exceptionally dry and hot. No rain fell until the 21st, and on that and the three following days a total of 155 points was recorded. After the wet winter this short hot and dry spell caused the soil to set very hard, and the downpour of rain proved most welcome and beneficial. All crops were beginning to show the effects of the hot dry weather, and especially so the oat crops. They have freshened up well after the rain, and given favorable conditions, should now make good headway. Natural feed is still abundant. All stock are healthy and in fair to good condition. Pests.—The caterpillars of which mention was made in last month's report have completely disappeared. Miscellaneous.—Fallowing operations have been rather hampered this season. First the very wet weather rendered work on the land impossible, and during the dry spell this month the surface soil dried so quickly and set so hard that fallowing had again to be suspended. The timely rain has enabled work to be resumed.

Veitch.—Weather conditions during the month have been satisfactory for cereal growing; the rain gauge registered 252 points. The average for the month is 184 points. About the middle of the month a few rather warm days were experienced. Crops throughout the district are now showing a nice healthy color, and making good growth. The early sown fields are out in ear and look promising. Good feed is now available on all burnt scrub land. Stock are all in good condition. Miscellaneous.—Scrub rolling and fallowing operations are now nearing completion.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of September, 1916, also the average precipitation to the end of September, and the average annual rainfall.

Station.	For Sept., 1916.	To end Sept., 1916.	Av'ge. to end Sept.	Av'ge. Annual Rainfall	Station.	For Sept., 1916.	To end Sept., 1916.	Av'ge. to end Sept.	Av'ge. Annual Rainfall
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Andadatta	0'11	5'86	3'70	4'76	Spalding	2'03	19'98	16'17	20'25
Brooks	—	3'25	5'87	7'58	Gulnare	1'79	18'09	15'78	19'74
Bygott	0'68	3'08	4'64	6'04	Bundakeer W. Wks.	2'00	18'49	13'63	17'29
Cris	0'85	4'69	5'20	6'70	Yaaka	1'62	15'69	12'37	15'27
Light's Creek	0'79	4'50	6'90	8'66	Koolunga	1'72	15'07	12'89	15'94
Alana	1'02	5'88	7'22	9'22	Snowtown	1'94	18'77	12'84	15'70
Imman	1'41	9'64	10'37	12'83	Brinkworth	2'00	18'32	12'59	15'48
Yokina	2'56	14'52	—	—	Blyth	2'15	17'20	13'31	16'34
Lawler	1'92	14'58	9'71	12'22	Claro	1'89	25'60	19'85	24'30
Tison	1'68	13'87	9'41	11'78	Mintaro Central	2'18	26'57	17'81	21'99
Prison	1'73	10'68	7'98	10'26	Watervale	3'09	28'85	22'22	27'17
Norm	1'42	14'51	11'03	13'78	Auburn	2'25	20'70	19'78	24'25
St. Angusta	1'59	8'13	7'48	9'46	Hoyleton	1'91	14'94	15'20	17'96
St. Angusta W.	1'64	8'20	7'41	9'36	Balaklava	1'80	13'27	12'81	14'03
Woe	1'18	8'94	7'95	10'01	Port Wakefield	2'33	14'01	10'28	13'13
Sammond	1'25	9'27	8'96	11'46	Terowie	2'30	11'87	11'56	13'71
Wilmington	1'94	16'62	14'75	18'26	Yarowie	2'51	13'45	11'97	13'91
Warrie	1'63	11'31	9'51	11'90	Hallett	1'85	14'04	13'29	16'40
Wase	2'10	23'58	8'78	23'04	Mount Bryan	1'95	19'99	12'83	15'73
Wattle Centre	1'71	13'92	12'71	15'83	Burra	1'82	20'19	15'35	17'82
St. Germain	1'57	6'80	10'18	12'84	Farrell's Flat	1'60	—	15'39	18'87
Wimburn	2'32	21'89	15'31	18'91					
Willa	1'84	12'95	11'86	15'08	WEST OF MURRAY RANCH.				
Woolack	—	8'24	8'49	10'86	Manoora	2'26	18'66	14'62	18'09
Warriston	1'47	12'13	8'98	12'22	Saddleworth	2'18	16'36	15'95	19'69
Warrburg	1'45	9'04	7'32	10'21	Marrabel	2'08	22'93	15'33	18'94
Wretha	1'52	12'06	10'45	13'24	Riverton	2'22	21'40	15'64	20'48
Wrore	1'34	12'30	10'64	13'42	Tarke	1'95	16'71	13'93	17'48
Wack Rock	1'77	11'74	9'57	12'25	Stockport	2'06	17'59	12'66	15'89
Wensburg	1'73	11'83	10'18	13'07	Hamley Bridge	1'87	16'07	13'21	16'45
Wingala	2'39	14'39	10'85	13'94	Kapunda	2'15	20'19	17'88	19'67
NORTH-EAST.					Freeling	1'84	18'40	14'27	17'85
Willa	1'92	10'29	—	—	Greenock	2'20	25'11	17'12	21'46
Wicra	1'65	9'05	—	—	Truro	1'85	21'39	15'98	19'74
Willa	1'43	7'16	6'15	8'22	Stockwell	1'90	20'76	16'25	20'30
Wakranga	1'95	7'98	6'07	7'94	Nuriootpa	1'85	22'19	17'13	21'25
Wakhill	1'62	7'18	6'22	8'46	Angaston	1'97	24'53	17'90	22'25
Wakburn	2'07	8'13	6'08	7'97	Tanunda	1'85	22'37	18'05	22'28
Wakra Hill, NSW	2'44	7'83	7'40	9'63	Lyndoch	1'74	20'21	19'89	23'01
LOWER NORTH.					ADELAIDE PLAINS.				
W. Erie	1'87	12'48	11'62	13'21	Mallala	1'78	13'84	13'65	16'88
W. Droughton	1'38	15'60	11'68	14'33	Roseworthy	1'62	15'90	13'92	17'31
W.	1'89	17'60	12'77	16'42	Gawler	1'73	19'44	15'58	19'21
W.	1'93	17'21	14'58	18'22	Two Wells	1'33	14'66	13'37	16'36
W.	1'75	14'87	13'00	17'27	Virginia	1'51	16'39	14'30	17'58
W.	2'15	16'86	13'75	17'46	Smithfield	1'71	17'02	13'93	17'30
W.	1'81	14'01	12'67	16'00	Salisbury	1'53	11'98	15'18	18'57
W.	1'81	14'99	12'51	16'62	North Adelaide	1'97	25'03	17'59	21'49
W.	1'87	17'16	14'77	18'32	Adelaide	1'68	21'72	17'32	21'04
W.	1'22	13'44	12'59	16'79	Brighton	2'23	22'15	16'38	19'93
W.	1'59	17'54	14'71	18'79	Glenelg	1'82	19'63	15'13	18'35

RAINFALL—continued.

Station.	For Sept., 1916.	To end Sept., 1916.	Ar'ge. to end Sept.	Ar'ge. Annual Rainfall	Station.	For Sept., 1916.	To end Sept., 1916.	Ar'ge. to end Sept.	Ar'ge. Annual Rainfall
ADLAIDE PLAINS—continued.					WEST OF SPENCER'S GULF—continued.				
Magill	1.47	20.72	22.28	25.69	Streaky Bay.....	1.36	13.71	13.33	15.1
Glen Osmond ...	1.04	26.82	20.74	25.26	Port Elliot.....	0.68	16.24	14.24	15.6
Mitcham	1.79	24.07	19.47	23.47	Port Lincoln.....	0.81	20.14	17.02	19.8
Belair	—	—	23.86	28.84	Tumby	1.07	13.15	12.56	15.0
MOUNT LOFTY RANGES.					Carrow	1.73	14.82	—	—
Teatree Gully....	1.78	25.16	23.13	28.19	Cowell	2.02	8.61	9.48	11.1
Stirling West ...	2.74	43.82	38.94	46.70	Point Lowly	—	—	9.56	12.2
Urquid	2.84	44.24	37.27	44.35	YORK'S PENINSULA.				
Clarendon	1.84	30.17	27.93	33.67	Wallaroo	1.86	15.24	11.64	14.6
Morphett Vale ...	2.07	21.73	19.07	23.32	Kadina	1.83	17.72	13.28	15.2
Noarlunga	2.68	19.07	16.92	20.23	Moonta	1.77	17.81	12.63	15.2
Willunga	2.45	24.20	21.67	25.98	Green's Plains ...	1.78	16.91	13.67	15.7
Aldinga	2.09	19.52	16.85	20.34	Maitland	2.03	24.73	16.61	20.8
Normanville	1.94	21.82	17.23	20.65	Adrocsau	1.74	15.43	11.44	13.9
Yankallilla	2.25	35.89	19.41	22.78	Port Victoria	1.38	18.33	12.61	15.3
Cape Jervis	0.75	13.39	13.75	16.34	Curramulka	1.60	18.09	15.81	15.6
Mount Pleasant ..	2.97	27.20	22.29	26.87	Minlaton	3.00	21.55	14.53	17.4
Bhumberg	2.55	28.58	24.41	29.38	Stansbury	2.94	17.14	14.17	17.6
Gumeracha	2.45	30.83	27.41	33.30	Warooka	1.80	18.09	15.66	17.2
Lobethal	2.54	35.50	29.62	35.38	Yorketown	1.89	17.93	14.57	15.5
Woodside	2.47	28.06	26.19	31.87	Edithburgh	1.80	18.34	13.68	16.6
Handorf	2.53	28.64	29.41	35.45	SOUTH AND SOUTH-EAST.				
Nairne	3.80	23.94	24.84	28.83	Cape Borda	0.86	21.30	21.83	23.8
Mount Barker	3.71	29.79	25.57	32.83	Kingscote	1.23	18.94	16.04	19.9
Echunga	3.40	29.43	27.27	32.83	Penneshaw	1.27	18.23	18.09	20.9
Macclesfield	4.96	28.77	25.28	30.72	Cape Willoughby ..	1.62	22.28	16.31	19.4
Meadows	4.65	36.35	29.29	35.52	Victor Harbor ...	1.91	15.85	18.41	20.1
Strathalbyn	2.95	17.23	15.81	19.28	Port Elliot	2.04	14.86	16.83	20.1
MURRAY FLATS AND VALLEY.					Goolwa	2.00	16.01	14.82	17.1
Wellington	1.81	12.43	11.90	15.01	Pinnaroo	2.92	14.40	14.32	16.1
Milang	1.62	10.66	13.19	16.08	Parilla	2.44	15.34	—	—
Langhorne's Bridg	1.91	11.04	13.20	15.27	Lameroo	2.81	16.12	12.94	16.1
Tallem Bend	2.12	12.12	—	—	Parrakie	2.80	13.79	—	—
Murray Bridge ...	2.82	11.07	11.42	14.32	Geranium	2.72	15.86	—	—
Callington	3.19	13.40	12.77	15.65	Peake	3.07	15.57	—	—
Mannum	2.76	9.92	9.45	11.67	Cooke's Plains ...	2.18	15.52	11.88	14.7
Palmer	2.92	13.79	12.53	15.60	Meningie	1.89	19.11	15.58	16.7
Sedair	2.06	12.84	9.63	11.92	Coomandook	2.34	17.73	—	—
Blanchetown	1.27	6.50	8.28	10.71	Coonalpyne	2.51	17.44	14.03	16.4
Eudunda	1.99	17.49	13.62	17.33	Tintinnarra	2.96	18.33	15.11	16.1
Sutherland	1.80	11.03	8.36	10.60	Keith	2.57	16.66	—	—
Morgan	2.02	8.73	6.95	9.29	Bordertown	2.74	16.26	15.58	16.7
Overland Corner ..	1.74	7.68	8.59	11.42	Wolsley	2.77	16.26	13.95	16.7
Renmark	2.39	9.24	8.99	10.93	Frances	2.82	15.27	16.08	16.8
Lexton	2.58	11.92	—	—	Naracoorte	2.85	18.20	16.09	16.8
WEST OF SPENCER'S GULF.					Penola	2.11	19.88	21.49	22.2
Eucra	0.79	8.24	8.36	10.13	Lucindale	1.85	18.15	19.10	20.2
White Well	0.60	9.87	7.48	9.67	Kingston	1.62	19.82	20.61	21.1
Fowler's Bay	0.85	12.33	10.45	12.11	Robe	1.41	24.51	26.91	27.7
Penong	2.47	17.17	9.97	11.93	Beachport	1.57	26.16	23.49	24.7
Murat Bay	2.35	12.46	—	—	Millicent	1.67	27.85	24.38	25.3
Smoky Bay	1.68	12.11	—	—	Mount Gambier ..	1.83	23.89	25.77	26.7
					C. Nrthumberland	1.38	12.11	22.46	23.7

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Oct.	Nov.			Oct.	Nov.
Amyton	223	—	—	Gawler River	†	—	—
Angaston	227	—	—	Georgetown	•	—	—
Appila-Yarrowie	•	—	—	Geranium	241	23	25
Arden Vale & Wyacoa	•	—	—	Gladstone	•	—	—
Arthurton	•	—	—	Glencoe	†	—	—
Bahklava	•	14	11	Glencoe	•	—	—
Beaufort	227	—	—	Goode	232	—	—
Beetaloo Valley	•	—	—	Green Patch	233-4	—	—
Belahie North	•	—	—	Gumeracha	•	—	—
Berri	241	11	8	Halidon	•	11	—
Blackwood	•	—	—	Hartley	243	11	8
Blyth	224	14	11	Hawker	•	10	7
Bookpurnong East	241	—	—	Hilltown	†	27	—
Booroo Centre	•	6	10	Hookina	223	10	7
Borrika	†	—	—	Inman Valley	243-4	26	23
Bowhill	•	—	—	Ironbank	†	7	4
Brentwood	230	5	9	Julia	†	—	—
Brinkley	•	7	4	Kadina	•	—	—
Bundaleer Springs	•	—	—	Kalangadoo	•	14	11
Burra	•	—	—	Kammantoo	†	7	4
Bute	•	—	—	Karoonda	•	—	—
Butler	234	9	—	Keith	•	—	—
Caltowie	•	—	—	Ki Ki	241	—	—
Canowie Belt	•	—	—	Kingscote	•	—	—
Carrieton	•	—	—	Kingston-on-Murray	†	—	—
Carrow	234	—	—	Kongorong	250	10	7
Cherry Gardens	245-6	10	7	Koonibba	235	10	—
Clanfield	235	—	—	Koppio	235	—	—
Clare	•	—	—	Kybybolite	246	5	9
Clarendon	•	—	—	Lameroo	•	—	—
Claypan Bore	•	9	6	Laura	†	—	—
Colton	•	—	—	Leighton	•	—	—
Coomandook	†	—	—	Lone Pine	223	—	—
Coomooroo	223	—	—	Longwood	†	—	—
Coomalpyu	241	—	—	Loxton	236	—	—
Coomawarra	•	—	—	Lucindale	247	—	—
Coombie	234	—	—	Lyndoch	•	5	—
Cradock	•	—	—	MacGillivray	246	—	—
Crystal Brook	•	—	—	Maitland	•	—	—
Cummins	231	14	—	Mallala	•	9	13
Cygnets River	242-6	5	9	Mangala	•	—	—
Darvort	•	—	—	Mantung	241	—	—
Dawson	•	—	—	Meadows South	•	10	7
Denial Bay	•	—	—	Meningie	•	—	—
Dowlingville	•	—	—	Milang	244	8	12
Elbow Hill	†	—	—	Millicent	247	10	14
Forest Range	•	—	—	Miltalie	233	7	4
Forster	241	—	—	Minardie	•	2	6
Frances	•	—	—	Mintaton	231	6	10
Freeling	†	5	9	Mintaro	224	7	4

INDEX TO AGRICULTURAL BUREAU REPORTS—continued.

Branch.	Report on Page	Dates of Meetings.		Branch.	Report on Page	Dates of Meetings.	
		Oct.	Nov.			Oct.	Nov.
Mitchell.....	*	—	—	Rameo.....	242	9	16
Monarto South.....	236	—	—	Redhill.....	†	10	7
Monteith.....	*	—	—	Renmark.....	*	—	—
Moonta.....	†	—	—	Riverton.....	†	10	7
Moorlands.....	*	—	—	Roberts and Verran..	†	11	—
Morchard.....	*	—	—	Roesenthal.....	†	11	—
Morgan.....	241	—	—	Rosy Fine.....	239-42	11	8
Morpbett Vale.....	*	—	—	Saddleworth.....	*	—	—
Mount Barker.....	246	11	8	Salisbury.....	239	—	—
Mount Bryan.....	*	—	—	Salt Creek.....	236	—	—
Mount Bryan East.....	*	—	—	Sandalwood.....	†	—	—
Mount Compass.....	*	—	—	Sherlock.....	†	—	—
Mount Gambier.....	*	—	—	Spalding.....	*	23	—
Mount Hope.....	255	—	—	Stirling's Well.....	†	7	—
Mount Pleasant.....	*	—	—	Stockport.....	*	—	—
Mount Remarkable.....	*	4	1	Strathalbyn.....	†	10	7
Mundalla.....	*	—	—	Sutherland.....	*	—	—
Mundoora.....	227	—	—	Tantanoola.....	250	7	4
Murray Bridge.....	237	9	7	Tarcowie.....	*	10	7
Mypolonga.....	†	11	8	Tatiana.....	*	7	4
Myponga.....	*	—	—	Tintinnarra.....	†	—	—
Myrta.....	*	—	—	Two Wells.....	*	—	—
McNamara Rore.....	*	—	—	Uraidla and Summert'n	245	2	6
Nantawarra.....	*	—	—	Waikerie.....	240	—	—
Naracoorte.....	248	—	—	Warcovie.....	223-4	—	—
Narridy.....	*	—	—	Warrow.....	†	—	—
Narrung.....	246	—	—	Watervale.....	†	—	—
Netherton.....	*	—	—	Wepowie.....	224	7	4
North Booborowie.....	235	—	—	Whyte-Tarcowie.....	217	—	—
North Bundaleer.....	*	—	—	Wilka-watt.....	240	—	—
Northfield.....	229	3	7	Willowie.....	†	10	7
Orroroo.....	†	—	—	Wilmington.....	*	—	—
Parilla.....	*	6	9	Wirrabara.....	225	—	—
Parilla Well.....	238	—	—	Wirrega.....	*	—	—
Parrakie.....	†	7	4	Woolawa.....	242	—	—
Peakeville.....	*	—	—	Woodleigh.....	242	9	—
Penola.....	249-50	—	—	Woodside.....	245	—	—
Penong.....	†	14	11	Wynarka.....	*	—	—
Petina.....	*	—	—	Yabmana.....	*	—	—
Pine Forest.....	*	—	—	Yacka.....	226	—	—
Pinnaroo.....	*	—	—	Yadnarie.....	*	—	—
Pomeroona.....	242	12, 26	9, 23	Yallunda.....	*	—	—
Port Broughton.....	*	—	—	Yaninee.....	*	—	—
Port Elliot.....	*	21	18	Yee-lanna.....	235	—	—
Port Germein.....	227	—	—	Yongala Vale.....	†	9	6
Port Pirie.....	227	7	4	Yorketown.....	*	—	—
Quorn.....	*	7	4				

* No report received during the month of September.

† Formal report only received.

‡ Held over until next month.

ADVISORY BOARD OF AGRICULTURE.

Date of Meeting—October 25th, 1916.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

AMYTON (Average annual rainfall, 11.82 in.).

September 12th.—Present: 12 members and five visitors.

HEADER V. STRIPPER.—The cheapest and best way to take a crop off, asserted Mr. A. Wallace, in a paper entitled "Header v. Stripper," was to use the binder and header. It conserved the fodder for a dry season, and the crop could be handled without any heavy work. It was also the most advantageous method of clearing the land, because the ground could be worked after any rain in the summer without being choked with straw. It also saved the trouble of burning and avoided the danger of fire. A crop cut in that way could be carted and threshed at leisure. Cut in the other way, there was a bustle to get the hay in before reaping, and there was always a bustle to get the reaping over lest a storm should come. When cut it had to be cleaned and the wheat carted in. The chaff had also to be carted before the stock were put in the paddock. Mr. W. Gunn said it would not pay to treat all crops as the paper recommended. Headed straw was not nearly so valuable as hay. A travelling thresher was best. Mr. Crisp did not consider that the extra value indicated would pay for the extra labor. He would cut a stack of straw for a stand by, besides saving all chaff. Mr. W. Baumgartel read a paper on the curing of meat.

COOMOOROO, June 17th.—A paper was read by Mr. I. Brown on the most suitable horse for the farm. He favored the Clydesdale and liked a short, strong-bodied horse, which, as a rule, required less feed than a leggy horse. Members generally agreed that a leggy horse should be avoided and that a thick-set horse looked better and commanded a better price.

HOOKINA, August 8th.—Mr. S. Stone read a paper on "The Labor Problem," and in the discussion which subsequently took place the opinion was expressed that the best means of overcoming the shortage of labor caused by enlistment, was co-operation. Mr. P. Murphy said that it was difficult to see profits in wheat-growing with wages so high and the price of wheat low. Mr. J. Carn and Mr. P. Stone said that wheat-growing was profitable at 3s. per bushel.

HOOKINA, September 5th.—Mr. T. Kelly read a paper on preparations for gardening, in which he said that a garden should be dug to a depth of 2 ft. to grow cabbages, because if the tap root struck hard ground the cabbage stopped growing and became hard. It was better to dig through the cabbages than moulder them. The digging destroyed the weeds and kept the ground damp. The best varieties of cabbage were Enfield Market, Elman's Early York, and Dutch Drumhead.

WARCOWIE, July 15th.—Mr. E. Telfer read a paper on fallowing, in which he advised feeding off the weeds from the land which it was intended to fallow in the succeeding winter in order to prevent them seeding. In a discussion which ensued it was suggested that heavy clay land should be worked lightly, whilst the soil was moist, in the winter, and then ploughed more deeply in the spring, when it would work up to a finer tilth and remain in better condition over the summer.

WARCOWIE, August 12th.—Mr. G. Growden read a paper, relating some experiments which he was conducting, but which had not yet been completed, in regard to feeding off and harrowing over a crop of smutty wheat. The wheat was reappearing much more thickly than in the first instance. Discussion followed as to the effect of feeding off wheat crops, and the general opinion was that it was beneficial.

WEPOWIE, August 8th.—In a short paper on the education of young horses Mr. S. McMahon recommended, in the first place, good tackling, which was essential. To catch the young animal he preferred a loosebox in a small yard, and by means of a short stick the wildest colt could be caught by moving around after it until the stick could be placed on it. Then the colt should be approached gradually and grasped with a firm hand and held, no matter how violently it plunged. Then the halter should be adjusted, the bit put in the mouth, and the animal should be tied up with a stout rope. The horse should be thoroughly mouthed, and by good careful handling it could be taught to work quietly without any trouble. He preferred putting a colt straight into a team of good, quiet horses when fit, and he would soon learn to do the right thing. Attaching young horses to logs often taught them to kick and become jilts. Horses should always be put in good hands to be broken in, because a well-broken horse was always a good horse.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

BLTYH (Average annual rainfall, 16.46in.).

Present: 13 members and two visitors.

THE HARROWS.—Dealing with the use of the harrows on the farm Mr. W. O. Eime, in a short paper, said that in the first place that implement should be put over the land as soon as possible after the fallow had been ploughed. If horse strength permitted the harrows should follow the plough, and subsequently cross the field. Land that had been lying out should be harrowed twice, but owing to its tendency to drift stubble fallow on the light sandy soil should only be once harrowed. The implement should be put over fallow that had been cultivated after each fall of rain. After the drill also harrowing should not be neglected. He preferred the stump-jump implement, with a blunt tine, to the set harrow. A good discussion followed the reading of the paper.

MINTARO.

July 15th.—Present: 28 members.

SHEEP ON A SMALL FARM.—To keep sheep successfully on a small farm, urged Mr. H. Schunke, in a paper dealing with that subject, it was essential to erect a good six-wire sheep-proof ring fence, and subdivide it into small paddocks, the fences for which need not be of a permanent nature, but wire netting and stakes would answer very well. On a farm of 500 acres it would pay to keep a few breeding ewes. It would not pay a small farmer to raise lambs for wool, so he should fatten them for market. He recommended large-framed, plain-bodied Merino ewes, with a good fleece of long staple, mated with a Shropshire ram. It was necessary to provide greenfeed for the lambs, and a small paddock sown early with barley would keep them going until the grass came up. In many cases small farmers might find it best to purchase store lambs off the shears, because, in normal seasons, they could be purchased more cheaply than they could be raised. In such a case, it would be necessary to provide a small paddock of feed to keep them going until after harvest, when they might be fattened on the stubble. Stunted or undersized lambs should not be purchased, even if cheaper than the others, because well-grown animals fattened more quickly and were eagerly competed for in the market. A few ration sheep should be kept on every farm. Cull ewes could be picked up cheaply after shearing. He had purchased them at 4s. per head, and at the end of the season got as much as 8s. per skin for them, so that his meat cost him nothing. If there was not water in the paddock for the sheep, it would pay to cart it into the trough for them. Fodder

should be grown on the farm for sheep, and he recommended sowing oats, especially on land affected with takeall. He would also grow Grey Dun field peas, which were one of the best fodders for fattening sheep and pigs. Mr. C. D. H. Wright preferred breeding lambs on the farm to buying in the market, because the latter might have received a check. Merinos from good stock were the best for the farm. Mr. D. Kelly said that the present was the best time to breed as many lambs as possible. It paid to feed ewes on hay, but, in wet weather, they wasted a great deal. If domesticated, however, they would soon get over the difficulty. Mr. A. Lowe said that peas could be grown with oats and harvested and fed to the sheep as hay or chaff.

NORTH BOOBOROWIE (Average annual rainfall, 16.35in.).

September 15th.—Present: 13 members and 33 visitors.

CASTRATION OF BOAR PIGS.—Young boars should be castrated when four weeks old, remarked Mr. J. W. Smart, in a paper on that subject. All that was required was a keen-edged knife and some kerosene to rub on the wound after the operation. With boars nine months old and upwards operators who did not possess an emasculator should tie the string with some threads of silk before removing the testicles, in order to prevent bleeding. When operating on large boars in late spring or early summer it was necessary to apply Stockholm tar, or some substance to keep the flies away. It was inadvisable to allow any pigs other than the mother to lie or sleep with the young ones, which were frequently crushed or ruptured in consequence, causing serious difficulties in castration.

CASTRATION OF BULL CALVES.—Bull calves should be castrated when young, even when only a few days old, asserted Mr. E. J. Dunstan, in a paper dealing with that subject, because then they would recover with less check to their growth. If left until several months old the calf should be tied by the neck to a firm post. The hind legs should be fastened together and tied to another post. That was all the tying up necessary. If the beast were full grown, an easy method of throwing it was to make fast the head to a post and then tie a longer rope to the one around the neck and put two half hitches, one behind the front legs and one in front of the hind legs. By gently straining on the long end of the rope the beast would go down steadily. The legs should then be tied as before mentioned. A sharp clean knife should be used, and a large cut should be made in the purse rather than a small one, in order to allow the inner wound to heal and discharge before the outside one had healed. A fair amount of olive oil should be poured into the purse after the operation, and the oil should also be rubbed on the outside to keep it soft and prevent the flies from attacking it.

LAMB TAILING.—In a paper on lamb tailing Mr. W. E. Hannaford recommended that the ewes and lambs should be yarded as quietly as possible, and be allowed to remain in the receiving yards for half an hour to cool down. Some of the lambs should then be run into the catching pen. The assistant should catch the lamb and lift it gently on to the marking bench or rail, place it with its back to his chest, grip the hind legs, and hold them securely between the lamb's front legs. The operator should then earmark the lamb, cut the tip off the purse, and with the thumb and first finger of each hand press the skin of the purse down until the testicles could be gripped with the teeth. They were then easily drawn out. The tail was then removed, and the assistant should slowly turn the lamb in such a way that it would fall gently on to its feet, and then it should be released. When possible the lambs should be left in a paddock adjoining the yards for a few days.

Mr. F. E. Place, the Government Veterinary Lecturer, gave a veterinary demonstration before the meeting, and subsequently delivered an address on the castration of horses.

WIRABARA (Average annual rainfall, 18.91in.).

August 12th.—Present: 23 members.

PREVENTION OF SORE SHOULDERS.—In a paper dealing with sore shoulders in horses Mr. J. A. Jaeschke said that the trouble was caused in four ways, viz., by ill-fitting collars, by too high or too low hames, by wet shoulders, and by the manner of feeding. The collar should always fit well on the shoulder, and should be a pipe collar in order that a horse might not "choke down." The lining should never be cut to pull out hair. When the horse shows signs of developing sores, the hair of the collar should be worked towards the inside with

a bag needle, if no proper instrument be at hand. The harness should fit exactly on the collar. If the horse shows a tendency to develop sores very high up on the shoulder then the hook was too high. It was the duty of the man who worked the horse to have the harness set right. Working in showery weather had a bad effect on the shoulders. As regards feeding, if crushed grain were given, one particular class of grain should be decided upon and adhered to, because a sudden change of feed seemed to affect the shoulders. Boils on the shoulders were the result of impure blood, and could be remedied by the administration of a dessertspoonful of sulphur once a week. There were some horses which, in spite of all precautions, developed sore shoulders. Animals of that sort should be worked with a breastplate, although it was not as comfortable to work in as a collar. It was inadvisable to allow hardworking horses to have soft young green feed; it was better to wait until the feed had developed some strength.

YACKA.

August 9th.—Present: 14 members.

WHEAT IMPROVEMENT.—Since the cost of wheat production was increasing and the system of cultivation appeared to have reached a standard which did not permit very large increases in that direction, in future other sources would have to be looked to in order to increase the returns per acre, observed Mr. A. O. Bahman in a paper on wheat improvement. That could be accomplished in three or four ways; firstly, by selection; secondly, by cross fertilisation; thirdly, by grading seed; and fourthly, by variety testing. He would confine his remarks to (1) selection, and (2) variety testing. In the first case, each farmer should attempt to select the best varieties and then try new varieties. If they were found wanting a careful selection should be made of the older ones. When the wheat was ripe it should be gone through and some of the best heads picked, paying due attention to the conditions under which the plant had been grown. The best heads should be taken from the best part of the crop, and not from watercourses or isolated plants. In that way about 2lbs. of grain should be gathered, and it should be sown in a small plot at seeding time. At harvest time another 2lbs. of wheat should be selected from the original selection crop, and that, with the seed from the small plot, would yield sufficient to sow an acre. From that area sufficient seed would be gathered to sow 25 or 30 acres, which should provide enough seed in an average season to sow an average-sized farm. By that system, which he commenced five years ago with Federation wheat, he reaped in the third year 21bush. from the "selection" seed, where that not selected yielded only 18bush. per acre. Another system by which the yield might be improved was by ascertaining the variety best suited to the soil in which it was to be sown. He did not recommend paying a high price for wheat which had given phenomenal results elsewhere. Wheat which has done well in one place might not do well in another. He had inaugurated a system of variety testing to ascertain which varieties were best suited to the local conditions in regard to yield of hay and grain. If any variety gave evidence of heavy yielding capacities a larger area would be sown with it the following year to prove its worth. Last year he had experimented with 100 varieties, but owing to the systematic manner in which he proceeded, the extra work was infinitesimal compared with the value of the results obtained. His experiments embraced seed from New Zealand, India, Russia, South Africa, and Canada. Some were too early and others altogether too late, notably Bordier, Alberta Red, Clansin, and Beardless Odesa. When testing due regard should be paid to the different quality of growth apart from the yield obtained, and it was necessary also to mark any outstanding features of superiority or deficiency. Its tillering proclivities and its resistance to drought and disease, such as rust, smut, &c., should also be noted, nor should its value for hay or for milling be overlooked. Not more than 1lb. of seed was sown in any plot, and in some cases as much as 24lbs. was reaped. He sowed 60lbs. of seed and 70lbs. of superphosphate to the acre. For check plots Federation, Marshall's No. 3, Yamilla King, and Glynas were used, and gave respectively the following yields per acre:—37bush. 29lbs., 30bush. 24lbs., 26bush. 36lbs., and 28bush. 4lbs. In searching for rust-resisting varieties he found that the following were least affected on the flag and straw:—Joffre, Major, Canberra, Prolific, Gully, Cowra, No. 15, Currawa, Triumph, and American 8. Most other varieties were greatly affected, but not sufficiently to affect the appearance of the

grain. In respect of smut-proof or highly smut-resistant wheats he believed that they were entering upon a new era. The late Mr. W. Farrar left three varieties which were almost entirely smut proof, namely, Genoa, Florence, and Cedar. He had grown Florence and Cedar for four successive seasons without picking the seed, and had not found a trace of smut amongst them. They were both good milling wheats, Cedar winning the championship at the Sydney show. It was a good yielder, but tough to thrash, and Florence had a tendency to shed its grain. Other more recent introductions of the smut-resisting class were Bomen, Nardoo, and American S.P. Of wheats for hay the best in appearance were Warden (late), Zealand (late), Firbank (early), J. No. 4 (early, which was green in the straw right to the base, even after the grain was well developed), Correll's No. 7, and New Zealand Blue. According to the results obtained with the plot system the most promising varieties were Joffre, Dookie Crossbred, Major, Caliph, Marshall's Unity, Marshall's Prolife, Canberra, American S, and Nardoo.

BEAUFORT, August 10th.—Extracts were read from *The Journal of Agriculture* on takeall, and discussion ensued. Mr. Mugford said that deep ploughing and leaving the ground too loose promoted takeall. The secret of success was early fallow. Mr. J. Simpson said that late fallow induced takeall. Mr. Zard said that takeall had diminished since the introduction of superphosphates. Land properly fallowed and sown would not be troubled with takeall.

MUNDOORA, June 19th.—A paper on sore shoulders in horses and their causes was read by Mr. H. Bates, and provoked considerable discussion. The opinion was expressed that too much corn and insufficient bran or cooling food were responsible for sore shoulders, as well as overwork.

PORT GERMEIN, August 19th.—A paper on the treatment of heifer calves was read by Mr. P. Blesing, who contended that the future of a cow depended upon her treatment in her earlier days. When calves were not properly fed, their digestive organs were dwarfed and stunted and, later on, when required to take large quantities of feed and convert it into milk they failed, because they had not been developed on proper lines. Calves should be given plenty of outdoor exercise and plenty of water. As soon as they were old enough to nibble they should be put in good pasture. Shelter should be provided for them at night and against inclement weather. The freshening period was a very critical one, and the heifers should be cared for and broken in by an experienced attendant, who should be a good, quick, easy and thorough milker, and one who should get the affection and confidence of the cow.

PORT PIRIE, July 15th.—Mr. W. K. Martin read a paper on the care of farm stock, in which he urged the necessity for providing plenty of fodder for them. He particularly emphasised the necessity for a straw stack, which afforded warmth and shelter and a medium of feed. Horses should not be overworked, and, with ordinary care, they would still be useful when 15 years of age. In the course of discussion, Mr. J. Greig advocated the necessity for good stabling, and, where high winds prevailed, that the stables should be enclosed on three sides.

WHYTE-YARROWIE, August 19th.—Mr. G. McGregor read a paper on departmental aid in breeding sheep, in which he advocated the sending out of experts by the Government to advise the farmer as to the best ewes to utilise for breeding, and the class of rams with which they should be mated. He also suggested that the Government should breed rams for sale at reasonable prices or for hire. Every effort should be made to improve the class of wool produced. Mr. G. F. Jenkins suggested lectures and demonstrations in sheep breeding should be given by experts in the various districts. Mr. E. J. Pearce said that greater care should be exercised in the selection of rams for use on farms.

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

ANGASTON, (Average annual rainfall, 22.25in.).

August 12th.—Present: 16 members and one visitor.

GRAFTING AND BUDDING.—Grafting was not necessary, except when it was desired to place a different variety of the same species on its own stock, said Mr. S. O. Smith, in a paper on grafting and budding. For instance, he said, the

quince and cherry plum rooted readily from cuttings. The former might then be used as a stock for some varieties of pears, loquats, or different varieties of quince. Cherry plum and others of the Japanese varieties might be used for all kinds of plums and prunes. Many fruits, such as apricot, peach, plum, pear, apple, cherry, etc., would not strike readily from cuttings, but, given seedlings or roots of these trees, an unlimited quantity of any varieties of them could be produced by grafting and budding. Budding was done in the summer, and might be practised as long as the sap was "running," that was, whilst the bark lifted easily from the wood. If the bark required to be opened forcibly, there was very little prospect of the bud "taking"; it would simply die of starvation. If there were any doubt as to the sap conditions, the young tips of the tree should be looked at, and if they were young and vigorous, with tender growth, the probability was that a bud could be put into the old wood, that was wood several years old. In any case, if a T cut were made and the blade of the knife, or better still, the reverse end of the budding knife inserted, and it was found that the bark lifted freely without tearing, and was juicy, the bud should be successful. In choosing the "wood" or "stick," the best and most consistent bearing should be taken and not water shoots, but preferably from the end of the boughs. The bud should not be cut out too deeply or there would be too much wood under the bud, and it would not then conform to the shape of the branch into which it was to be placed. It was a mistake to strip off the small chip of wood, because it endangered the vitality of the bud. The safer method was to raise the knife slightly when just under the bud, thus considerably reducing the thickness of wood left. In the stock or limb to be budded a T-shaped cut should be made, the bark lifted away, and the bud inserted. It should be pushed down until well covered, and should be then tied with strong bonnet cotton. After a week or 10 days the leaf stem should be touched, and, if the bud had "taken," the stem would fall off. At the end of the season, when the sap flow was falling off, the string might be left on for some time; but, early in the season, when the sap was in full flow, the string should be taken off, when the leaf stem had fallen, and the branch might be cut off immediately above the bud. Grafting should be done in late winter or spring. For small limbs or trees, about the thickness of a finger or a pencil "tongue" or "whip" method was generally used; for thicker wood, the cleft or split; and for large limbs or butts, the "crown" graft. In the "whip" graft both scion and stock or limb should be about the same size, with a sloping cut about an inch in length, and a nick cut in both. When pushed one into the other the nicks tended to hold the scion and stock in place whilst being tied. Tying might be done as for budding, and, if above ground, waxed strips should be wrapped around to exclude the air. In cleft grafting, the stock or limb was split and the scion cut wedge-shape to fit. The split should be opened with a wedge and the scion inserted so that the bark of the latter met the inner bark of the stock. The wedge was pulled out and a waxed bandage put round the graft, when completed, to exclude the air. "Crown" grafting was much preferable to the cleft, because the latter afforded a harbor for vermin, and dry rot was more likely to follow. The tree should be cut off and the bark opened or eased from the trunk with a knife blade. A scion, cut on one side with a long slicing cut, should be pushed or hammered in. A small shoe nail should then be driven through the bark and scion in order to fix it securely. A strip of grafting cloth should be wound around to exclude the air. In large trunks a dozen or more grafts might be placed, and if all or most of them should "take," those most suitably situated might be selected and the remainder pulled out. In place of waxed cloth, grafting wax composed of 4ozs. resin, 2ozs. beeswax, and 1lb. beef or mutton suet might be used, but it was a messy job and not so economical in wax.

LONE PINE.

September 12th.—Present: 16 members and 11 visitors.

PIG RAISING.—The pigsty, remarked Mr. J. A. Butfield, in a paper on pig raising, should be large and divided into two portions, one open to admit sunlight, and the other covered for protection against the weather. The floor should be sloped, in order to facilitate drainage. Under no circumstances should pigs be permitted to stand in the wet. Straw should be provided as bedding in the covered portion, and

the sty should be cleaned every week. Cleanliness, warmth, pure air, sunlight, good drainage, a variation in food, warm and cold, dry, moist, and green, were essentials in successful pig raising. The Berkshire was the most suitable all round pig, and the sow should be larger than the boar, which should be selected from a breed well suited to the market, and should be sound, well shaped, and free from hereditary blemishes. A sow should have 12 teats, and should be 12 months old before she had her first litter. She should produce two litters per year. Inbreeding should be avoided, because the pigs became smaller and the sows almost barren. Sows should have a sufficiency of food, but never allowed to become fat. Litters should arrive in March and September, or earlier in the year if possible. In feeding for pork young pigs should be given skimmed milk, with barley added. Green feed quickened the appetite. Highly bred pigs kept growing from birth might be made porkers at sixteen weeks. For the pork market a pig should weigh about 100lbs. in the carcass, and for the bacon curer the weight should be 120 to 140lbs. Mr. A. J. Fromm, in reply to a question, said that the most suitable pig for the market was the Berkshire-Essex cross, well fattened. Mr. G. Hoffmann preferred the Berkshire-Yorkshire cross. Pigs for market should be fed on dry wheat for the last four weeks. Mr. A. Weekert said that pigs should be castrated at the age of six weeks and left with the sow for two weeks after the operation.

NORTHFIELD (Average annual rainfall, 19in.).

July 11th.—Present: six members.

FARM BUILDINGS.—A well drained site, easily accessible for a loaded wagon or storage of implements, was the first essential in laying out farm buildings, declared Mr. E. W. Kelley in a paper on that subject, and he added that provision should be made for future extensions if necessary. Concrete or stone walls were most serviceable, and when gravel and sand were easily procurable would probably prove cheaper than iron at the present time. The stable and chaffhouse should be under one roof, with the stable opening towards the north to admit the free entrance of sunlight, which kept the interior sweet and wholesome. Sliding doors might be provided, to be closed on rough nights, but generally they might be left open. The hay and chaff shed should be at the back, with a passage way to feed from the front of the manger. In that way the labor of feeding would be less than with two buildings separate, besides saving material in construction. A rooey loose box should be provided, enclosed with a good strong yard, which would prove very useful for isolating sick horses or weaning foals. No set plan could be laid down for the implement shed, barn, &c., as each farmer would build according to his own conception of his particular requirements. Generally a building, 50ft. x 20ft., with room in the centre to drive a wagon load of wheat or super, under cover would be found convenient. A raised platform level with the floor of the wagon could be erected at one side of the store for the purpose of storing seed wheat and manure, whilst the other side could be used for the binder, drill, and other implements. A floor space, 20ft. x 15ft., provided with sliding doors, could be mouse and poultry proof. The remainder of the building could be left with open sides. Milking sheds should be paved, and where water was available from a main, provision should be made for flushing it daily. If a number of cows were kept, a separator room should be provided near the milking shed. Pigsties and calf pens should be situated on a well-drained site, a short distance from the milking shed, but all such buildings should be well away from the stables. Mr. J. Williams preferred the stable opening to the east. Mr. D. Rowe favored having the stables and implement shed under one roof. Mr. Dall would like to see an arrangement by which, say, a dozen horses could be placed head to head, with a passage way between the mangers. Stalls should be strong and roomy. He preferred the eastern opening for the stable, and the engine should be housed in a shed of its own, outside the chaffhouse. Provision should also be made for poultry with yards and shelter sheds.

NORTHFIELD (Average annual rainfall, 19in.).

August 2nd.—Present: eight members.

THE FARMER AND THE BUREAU.—In a paper dealing with the work of the Agricultural Bureau Mr. A. Sandevock suggested not only that farmers should induce their sons and the workers on the farm to become members of the Bureau, but that

the Bureau would be bettered and strengthened if the farmers' wives and daughters were admitted. The outing would do them good, and they would benefit socially, physically, and mentally. It was the wives and daughters who attended to the milking, butter making, the poultry, and the pigs. He had known cases in which the women exceeded the men in their knowledge of those matters, and in the treatment of cow and poultry ailments. He concluded by contending that wheat, sheep, cattle, cow, pig, and poultry farmers, and also gardeners, their wives, their sons, their daughters and their men servants should become members of the Bureau, because by that means they could get help and give help from their fellow laymen by intercourse, by questioning, by the reading of papers and addresses, by experiments, by practical demonstrations, by homestead meetings, and by social evenings. Mr. F. Chardon said that the suggestion in regard to wives and daughters becoming members of the Bureau was a novel one, but well worthy of consideration. Mr. A. Berg said that the ladies would be better at home. Mr. W. J. Dall favored the formation of Ladies' Branches.

SALISBURY, August 1st.—Mr. A. Hooper read a paper, in the course of which he described many shortcomings in the conduct of farms and made suggestions for the improvement of farming methods. He referred to the necessity for abundant shed accommodation, expressing a preference for the T-head structure. Careful attention to such matters as fencing, harness, and vehicles was urged, and surprise expressed at the little attention given to crop rotation. Such crops as peas, oats, barley, and rye might well be included in their practice, he said, and catch crops—sorghum, maize, vetches, rape, &c.—for feeding to cows and sheep, were too frequently neglected. He strongly impressed on members the wisdom of taking vigorous steps to suppress noxious weeds, in particular Paterson's curse, star thistles, and Cape tulip. In regard to livestock, the sheep to the acre was the ideal they should have in mind. Hay stacks could not be disposed of to better advantage than by being fed to that class of stock. That feed could be supplemented by lucerne, barley, rye, rape, and mustard, which would be found to provide fodder the whole year round. The most desirable class of sheep was the Lincoln-Merino cross; for fat lamb production the best of the first-cross ewes could be mated with the rams of the approved mutton breeds. "A few pounds spent in the first place in getting the best of stock," the paper concluded, "will handsomely repay the purchaser, as only by keeping the best possible can he expect top price for his produce."

YORKE PENINSULA DISTRICT. (TO BUTE.)

BRENTWOOD.

August 10th.—Present: 15 members and two visitors.

SHEEP AND LAMBS.—Largely a reflex of his own practice and experience was the burden of a paper on sheep and lambs by Mr. C. H. Boundy, in which he emphasized first the principle that it was more profitable for farmers to keep ewes for breeding purposes than dry sheep for wool alone. With that end in view it was advisable to buy four-tooth Merino ewes from which good lambs could be bred for four years. The ewes would cost 30s. each off the shears, but, in 12 months each would yield 8lbs. of wool at say 9d., equal 6s., and produce a lamb worth about £1. Thus, in the first year, the ewe would have gone a long way towards paying for herself, whereas with dry sheep it would be necessary to keep a larger number right through the summer to aggregate the same value as the ewes and lambs. He kept about 300 ewes which produced about 225 lambs. If he kept dry sheep it would be necessary to have 500, and the feed and water for the extra 200 during the summer months amounted to a considerable item. On the other hand the lambs arrived when there was plenty of feed about. He worked the proposition out in the following way:—(1) 300 ewes, averaging 8lbs. of wool each at 9d. per lb. equals £20; 75 per cent. lambs, 225 at £1 each, equals £225; total, £245. (2) 500 dry sheep, average 10lbs. of wool at 9d., equals £187 10s., showing a balance in favor of ewes of £127 10s. For breeding purposes he preferred Merino ewes, which were

the most prolific breeders, were well suited to the climate, good mothers, and very quiet. It was most profitable to cross for mutton and export lamb, which were usually well framed animals, and if left on the producers' lands would yield good wool, and reach maturity quickly. For a first cross he favored the Lincoln ram and the Merino ewe, but if a further cross were desired the crossbred ewes should be mated with Merino rams, which would produce an excellent comeback with good wool and carcass. About the middle of November he put the rams with the ewes, and the lambs were dropped in April and May. About the end of January he removed the rams, because lambs dropped after the end of June would not mature for market before summer. It was inexpedient to run the rams with the ewes all the year round, because then provision required to be made for summer lambs. That meant keeping a smaller number of ewes or providing an extra paddock, thereby probably interfering with the stubble land being kept for the next year's spring lambs. In mating as he suggested, the lambs would be ready for market in two drafts, the first in the middle of October, and the second the first week in November. The ewes could then be turned on the fallow, and the rams put with them about the middle of November. The ewes would not be too fat for breeding purposes. He preferred to use two rams for every 100 ewes, or, say, seven rams for 300. If plenty of rams were available more should be used, but not less than the number mentioned, as it was advisable that the lambs should be dropped together, in order that they could be treated in two tailings. Lambs should not be too big before being tailed. In selecting a ram it was profitable to purchase a well-bred one. He preferred a low set square-framed animal with wool curly and fine. He recommended sowing Cape barley for the ewes on small holdings, because it increased the stock-carrying capacity of the farm. It was also payable to feed sheep after the first rains on chaffed hay or on oats when cheap. Mr. J. J. Honner said that lambs dropped at the end of July last year, although not worth shearing at shearing time, had been sold in March for 24s. each. During the drought he had 150 wethers for which he had paid 35s. per head, and he could not fatten them sufficiently for the market. Their fleeces yielded approximately 10s. each, and he found that he could only get about 10s. each for the wethers. He fed them on chaffed hay at £4 per ton, and they fattened on 2lbs. per day per sheep. When the stubble was ready he turned them into it and sold them in the following April. After deducting the cost of the hay and the original price of the sheep he cleared £100 on the transaction. Farmers with a chaffing plant could make a profit on the hand feeding of sheep, with hay at £3 per ton. For lambing ewes hand feeding was not conducive to milk production, and the lambs missed the green pickings, but the ewes put on splendid condition, and he had no losses when they were turned out. Mr. J. Boundy said that he had known lambs dropped in July which did just as well as those born in May, because the later lambs received no check. Mr. H. L. Martin said that his practice was to keep the rams with the ewes until all the ewes were in lamb.

MINLATON, August 11th.—Mr. J. McKenzie read a paper on the application of mechanical science to agriculture. After a review of the revolution which mechanical inventions had worked in farming operations, he concluded by expressing the opinion that the model farm of the future would, when electricity took its place in the progress of mechanical science, be provided with a power house instead of a stable. Discussion followed in which the methods of 40 years ago were contrasted with those of to-day.

WESTERN DISTRICT.

CUMMINS.

August 12th.—Present: seven members and three visitors.

FALLOWING.—After setting out the better returns derived from fallowed land, Mr. G. H. Potter, in a paper dealing with that operation, remarked that if land should be pestered with weeds fallowing should be continued and the working of it should be left until shortly before drilling; then it should be done lightly and just sufficiently to make a good seed bed. He was averse to deep fallowing, particularly on new land, but the ploughing should be thorough, and every inch of land turned.

MANURES AND MANURING.—The best way to treat a soil, said Mr. Konrad W. M. Beisel, in a paper on manures and manuring, was to work it judiciously and manure it suitably. It was a fallacy to believe that tillage would replace fertilisers or that fertilisers would replace tillage, because the two required to go hand in hand. Tillage was not a substitute for, but an attribute to manuring. Plants required 10 chemical elements for their perfect well being. Manures were divided into two sections, organic and inorganic, the first embracing animal and vegetable substances, which contained an appreciable quantity of nitrogen, and the latter composed of purely mineral substances, which, in general, contained no nitrogen. As regarded the organic manures, farmyard and green manures supplied the soil with the complement of plant food, and they greatly improved the physical condition of the soil. Therefore, one of the most valuable substances a farmer could introduce into his soil was organic matter, because the productive capacity of a soil largely depended thereon. A necessary consequence of that conclusion was the greater use of yard manure, and the growth of pea, rape, rye, or mustard crops—some of the soundest factors in successful agriculture. Every farmer naturally desired more yard manures than he was able to procure. However, what he did get he should not stack in front of stables to waste or to lose its necessary effect; but he should apply it over different areas of soil each successive year, and reinforce it with fertiliser. The best and most practical method by which a farmer could ascertain the deficiencies in his soil requirements was by experimenting systematically. He would observe the effect of different fertilisers on his crops, and, gradually learning the peculiar need of his soil, would fertilise accordingly. In many cases it was sufficient to merely test different fertilisers as a part of the regular farm practice; in other cases it would pay to lay out fertiliser plots. A common method of testing fertilisers was to use different kinds indiscriminately until one was found that answered the purpose. That was usually an unsatisfactory method. Another way was to apply each of the three plant foods separately, and in combination. That was an exact and reliable method. The farmer might have a crop the stalks of which were puny and short, the color inclined to be of a yellow tint, and the ears might be small, but somewhat larger than the size the stalk would appear able to grow. What was deficient in that kind of soil? Nitrogen promoted growth and gave a rich, dark, healthy color to the foliage. If then the crop was puny and short, and of light color, it was safe to say that the soil needed nitrogen. If the ears were set and filled well, in proportion to the size of the stalk, there was enough potash; but if the stalk did not shoot and did not fill properly, the soil needed potash also. If the grain was slow in coming to maturity, then the soil required phosphoric acid. Many farmers might be tempted to apply raw, ground phosphate, by reason of its cheapness; but such manures should be consistently avoided. Under the peculiar soil and climatic conditions which exist in South Australia there was little hope of the insoluble phosphate ever becoming available for the use of the crop. It was of the greatest importance to use superphosphate, in fact it had been conclusively demonstrated again and again in departmental experiments that super. was indispensable to successful farming. A great deal of confusion existed as to the rate of application. Generally speaking, the drier the district the smaller the application. In the Loxton district as little as 30lbs. to 40lbs. was used, while in a comparatively moist district 2cwt. could be used with impunity. The indirect effect of heavy dressings on the resultant pasture should always be remembered. By consistently heavy dressings of superphosphates pastures had been improved beyond recognition. However, the rate of application under any given circumstances could best be determined by actual experiment. In purchasing a manure the producer should always insist on getting the guaranteed chemical analysis, and in choosing a manure should use discrimination, judgment, and observation. Experimenting was the keynote to successful agriculture.

GOODE (Average annual rainfall, 12in. to 13in.).

August 9th.—Present: 11 members.

FALLOWING.—As soon as seedling has been finished fallowing should be commenced, declared Mr. Wm. Tainsh, in a paper on that subject. The horses be continued, were then hard in flesh, and the ground soft, enabling the plough to do good work. The ground should be ploughed at least 4in. deep, which was 1½

deeper than usual, to ensure the breaking up of the crust, which formed about 2 in. below the surface. The fallowing might go on until the grass was in seed. The early fallow would probably require treatment later on with a scarifier or cultivating plough to kill weeds. A flock of sheep would answer the same purpose. Land which had a tendency to drift should be fallowed first to solidify it, and land that was prone to become cemented should be cross cultivated and harrowed after rain.

In a paper dealing with the same subject Mr. W. G. Morecombe said that the land after cultivation for a period became so dirty that it was practically impossible to grow wheat on it without fallow. The period between seeding and harvest could be profitably devoted to fallowing, because the horses would otherwise be idle. Three inches was sufficiently deep to fallow light mallee soil, and it was no advantage to plough any deeper owing to the difficulty in consolidating the lower portion into a good seed bed. He preferred a share implement, which would cut cleanly to destroy weeds without going deeper than 1½ in., and would at the same time leave the soil ridged, which was a hindrance to drift. Harrowing after heavy rains would be found profitable, because it would break the crust and preserve moisture. If sheep could be turned on the fallow weeds would be prevented from seeding and the ground would be fertilised—a double advantage. Mr. W. Pollard said that if the land were turned up roughly drifting would be staided and the air and sun would improve the soil. When the fallow needed cultivation to destroy weeds he preferred to use a tine cultivator instead of a disc. Where there was a liability to drift a bag wrapped around alternate standards would cause ridges and impede the drift. Fallow should not be sown before rain fell, and should be lightly cultivated to destroy the first crop of weeds. The practice of trying to cover too much land with the plough was condemned, and a narrower cut, which would completely turn the sod, was recommended.

GREEN PATCH (Average annual rainfall, 26.56 in.).

September 11th.—Present: nine members.

CARE OF HAY AND STACK BUILDING.—It was beyond doubt, affirmed Mr. C. Venning in a paper dealing with the care of hay and stack building, that the best method of storing hay for use was to put it under an iron cover. That paper, however, was for the benefit of those who adhered to the system of open stacks and thatching. A well drained dry position should be selected, and it was essential that the bed should be laid lengthwise north and south, in order that the sun might shine on both sides and dry the hay equally. A good hay bed of logs should be provided to keep the stack about 1 ft. off the ground. In putting the first layer of sheaves down the ringers should be bound with the heads of the consecutive layers in to the middle. After that it was better to bind with the butts of sheaves, because it was easier to build. The middle should be kept well up, in order to allow the stack to spread a little as it settled down. Before putting on the roof, a ring layer of sheaves should be placed, projecting about 6 in. all round, forming what was called the eaves. A load of nicely tied long sheaves should be kept back for that purpose, in order that they might be firmly held in the stack. Before roofing an extra high layer should be built in the middle, and it should be fairly steep in order that, as the sheaves were laid on the roof layer by layer, they would be all sloping outwards, an arrangement which caused rain falling upon the stack to run away from outside sheaf to sheaf until it dropped over the eaves clear of the stack. Thatching grass, grubbed up in large cakes, and placed on the roof, made a waterproof cover, and was far superior to straw. It was only in that district that the thatching grass grew. In the middle parts of the State straw roofs were sufficient to keep the rain out, and in the North no covering was required beyond building a steep roof.

MILTALIE (average annual rainfall, 14.55 in.).

August 11th.—Present: 11 members and two visitors.

ADVANTAGES OF FALLOWING.—The first essential to fallowing, observed Mr. W. E. Hier, in a paper discussing the advantages of that operation, was to have the paddock ready and fit for fallowing—that was, that the land should be cleared of

straw or shoots. Straw, if ploughed in, had a tendency to encourage takeall. It was not good policy to plough in mallee or other bushes. He would use a five or six-furrow plough, not too light, or the land would soon grow hard. He would work the ground, which had been well ploughed, in lands two chains wide, with a cultivator. Ground which had been ploughed in lands could be cross-harrowed, which was a great help to stimulate the growth of weeds, which could be finished with in the springtime. If the weeds were allowed to seed, much of the advantage of fallowing would be lost. Fallowing economised horse strength, because well worked fallow did not require deep working at seeding. Fallow should be worked in rotation, viz., fallow, wheat, and oats, if liable to takeall, but if not, another crop of wheat might be taken. To derive the greatest benefit from fallow, sheep should be kept, because they were of great assistance in preventing weeds from seeding, besides making good use of feed which would otherwise be wasted. He had noticed that small paddocks were the best worked, and, as a rule, produced the best crops. At all events, 200 acres well worked would do better than 300 acres only partially treated. Mr. W. G. Smith favoured plunging an extra depth every few years. Mr. J. P. Story pointed out that it was not always possible to cut mallee shoots and have them raked off and burned before fallowing. He preferred the rotation—wheat, oats, feed, and fallow. Mr. P. J. McEachen advised the use of the roller, as well as the harrows. Mr. L. Auger did not agree with the statement that 200 acres thoroughly fallowed were better than 300 acres only partially treated, because the produce of the extra 100 acres, even with a lighter crop, would require a lot of making up on the 200 acres. However, very much depended on the size and nature of the farms. Mr. J. S. Jacobs related that in his experience the rotation of wheat, oats, and feed and fallow was the only way to provide against takeall.

BUTLER, July 24th.—After the annual meeting Mr. C. F. Jericho initiated discussion on late seeding. The consensus of opinion was that seeding should be over by the middle of June. In the present season late sowing was unavoidable owing to the weather conditions. Sowing on fallow when dry was conducive to the growth of weeds. Though some good results had been obtained from late sowing the practice should be avoided. In answer to a question Mr. C. F. Jericho said that the best method of treating leakage in an underground tank in which the water had dropped 3ft., was to pump out all the water at once, cut out cracks, and stop with cement. If the water were not pumped out the swelling of the surrounding clay from the leakage of water might tend to push the walls of the tank inwards.

CARROW, August 10th.—Mr. F. Burt read a paper on stimulating interest in Bureau work. Discussion followed in which the views expressed in the paper were commended, and it was urged that members should visit each other's farms, and that the best kept and best managed should receive a prize.

COORABLE, August 12th.—Mr. E. J. Stretton read a paper suggesting the establishment of boys' clubs on the lines of the boys' corn clubs in Minnesota, U.S.A., in which prizes were offered for the best results from acre plots entirely tilled and harvested by boys. After discussing the matter, it was resolved that members should interview likely lads and ascertain whether such a project as suggested would be welcome.

GREEN PATCH, August 14th.—Members discussed various questions which were raised. Members stated that yacca land, after producing a good wheat crop for a couple of seasons, would not produce a profitable crop afterwards, whether given a spell or not. The general opinion was that oats should be grown for a number of years before wheat was tried again. Mr. F. Gore, a practical gardener, in answer to questions, said that to ensure a profitable return from growing rhubarb the ground should be worked thoroughly and manured well. It was not usual to take out rhubarb plants in the winter for storage. Rhubarb plants required removing in periods which varied from four to seven years, and should be planted 2in. under the surface in rows. He suggested that children should be taught to tend the farm garden. He expressed the opinion that it was not wise to plant sugar gums near the orchard, because they absorbed considerable moisture from the soil and were a great harbor for birds, because they blossomed just when the fruit was forming.

KOONIBBA, June 15th.—A paper on wet and dry sowing was read by Mr. A. Moody. Considerable discussion ensued, the trend of which was against dry sowing. Wheat sown after the rain rarely came to any good.

KOPPIO, August 8th.—Mr. Thos. R. Gardner read a paper on stimulating interest in Bureau work, and the members who discussed the paper endorsed the views expressed. Mr. R. T. Richardson read a paper on the bulk handling of wheat, which caused considerable debate.

MOUNT HOPE, August 18th.—Mr. G. A. Vigar read a paper on dairying, in which he declared a preference for a milking strain of Shorthorns. He found barley the best green feed, which the cows would eat in preference to any other. He advocated securing the best cows possible, and giving them as much feed as they would eat every day. They should be treated kindly and milked regularly. The milk should be separated every day, and butter made twice a week. All utensils should be kept perfectly clean, and it would be found that the cow was about the best side line on the farm. In the discussion which followed members generally agreed with the views expressed in the paper.

SALT CREEK, August 12th.—A short paper, entitled "A small blacksmith's shop," was read by Mr. W. Gale, in which he set out the many savings in the way of repairs which could be made by a farmer who had a small blacksmith's shop on the farm. He recommended the following articles:—Anvil, 30s.; hammers, 60s.; drilling machine, 35s.; vice, 30s.; taps and dies, 30s.; hammers and tongs, 10s.; total, £9 15s. Mr. A. Venning said that his blacksmith's shop saved him £50 per annum. Mr. G. Barber recommended the purchase of a blower instead of bellows.

SALT CREEK, September 9th.—Mr. H. G. Hornhardt read a paper on mixed farming, in which he advocated the breeding of horses and cows. He also said that no farm should have less than 100 sheep, and that it should have as many more as it could carry. Pigs should also be kept, but not in too large numbers. Mr. W. Gale said that he had not had much success in breeding horses and cattle. Mr. Lee, sen., thought it more profitable to rear cattle than light horses. Mr. A. Venning said that the general opinion was that horses would be dear after the war, and a commencement should be made now to breed animals of the right stamp. It paid to breed cattle at present prices. He preferred poultry to pigs. Every farmer should keep a few sheep, but should avoid overstocking.

YEELANNA, August 12th.—A paper on co-operation among farmers was read by Mr. W. Watkins, in which the advantages to be derived from adhering to the principle was outlined. Considerable discussion followed, in which the views of the writer were endorsed.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES)

CLANFIELD (Average annual rainfall, 16in. to 17in.).

July 15th.—Present: 11 members and three visitors.

PREPARATION FOR AND SELECTION OF SHEEP.—As the majority of farms in that district were not yet securely fenced or laid out in permanent paddocks, the opportunity should be taken of making a plan of the subdivision which would provide the best water supply with the minimum cost of fencing, observed Mr. A. H. Wilkins in a paper dealing with the preparation for and the selection of sheep for that district. No definite plan, he said, could be laid down, because the position of the homestead and the water supply required to be considered in each instance. All farmers could not have their dividing and subdividing fences sheep-proofed in the one season, but the larger paddocks could be laid out so that when the subdivisions were made, the water supply would be accessible to every paddock. Though sheep could be accustomed to doing with little water, it was not a wise policy, least of all in the dry months of the year, and much better results were obtained if the sheep could get water just when they felt inclined. The class of fence to be erected depended upon the breed of sheep to be kept. British breeds were all more or less rogues, and transmitted that failing to their progeny.

In any case the fence should not consist of less than six wires with the first wire 5in. from the ground, and the others 5, 5, 6, 7, and 10 inches respectively apart, which would give a fence 3ft. 2in. in height. It would require 11wt. of No. 16 wire per mile to construct such a fence. Posts or standards should not be more than 11ft. or 12ft. apart. If it were intended to use the flock for clearing up fallow, not troubling about the fat lamb market, and depending on wool for the chief profit, then the pure Merino would be best. For that breed of sheep, well grown, plain-bodied ewes from the Middle North carrying a fleece of 56 or 60 quality should be secured, because it was most used, and excited the keenest competition. A medium sized lock was preferable either to a very small or a very large lock, both of which tended to let dust down on to the skin. The ram should be obtained from a well-known breeder, even if it cost more. It was a grave mistake for those who were not experts to attempt to breed their own rams. Farmers who proposed to cater for the fat lamb market and also desired a fair wool clip should mate Merino ewes with a Leicester ram. That cross would produce profitable hoggets should the season prove unsuitable for raising fat lambs. Those who had faith in the seasons and were prepared to sow the sand ridges with oats or barley for feeding purposes should mate Lincoln cross ewes with Shropshire rams. The product would be a very shapely lamb growing quickly, which would, under favorable conditions, realise when four months' old, a very high price, either in the home or export markets, and should weigh (dressed) from 56lbs. to 10lbs. In mating British breeds of sheep with Merino ewes it was not wise to use maiden ewes, because the broad top of the head of the cross-bred produced trouble in lambing. The Leicester and Southdown were least likely to cause difficulty in that way. Under present conditions in that district he favored the pure Merino, but as the land became cleared and acquired a heavier coating of natural grasses, he was inclined to prefer the Leicester-Merino cross. Although the Lincoln cross ewe, mated with a Shropshire ram gave a quick and a very good return, it was very difficult to obtain a good class Lincoln cross ewe. In answer to a question Mr. Wilkins said that he did not like the Dorset Horn because they provided coarse meat, and the ewes had a severe time when lambing.

LOXTON (Average annual rainfall, 12in. to 13in.).

August 4th.—Present: 16 members.

WORKING THE SOIL.—Farmers should fallow from 200 to 400 acres every year. declared Mr. P. A. H. Thiele in a paper on working the soil, and he added that in that district the land should be ploughed early when wet; he preferred the months of June and July, and certainly not later than August. Wet ploughing tended to make good fallow. It was much better to fallow on a clean, bare surface than to attempt to work stubble land or land with rubbish, because dirty ground hindered the work of the cultivator, and might induce the risk of black rust or takeall. In that district ploughing should be to a depth of 4in., and the ground should be harrowed when the weather was dry, to destroy grass and weeds on the fallow, which often rooted in and grew again after wet ploughing. Harrowing also levelled the ground and gave it a clean aspect. If weeds made their appearance the land should be worked crossways with a bridge cultivator. If the weeds were permitted to seed they would probably spoil the fallow for the ensuing sowing. Well worked fallow should give double the yield obtained from grassy, ploughed soil. More land should not be placed under cultivation than could be comfortably coped with. Only the best-known varieties of wheat or the varieties most suitable to the district should be sown. It would be fruitless to comply with all the conditions of soil cultivation unless the strain or varieties of wheat grown could be fully relied upon. In the discussion which followed opinion was divided in regard to the treatment of sandhills, but it was agreed that old land should be well worked and that new land needed only one turning over of the virgin soil before cropping. Mr. G. W. Beverley gave a demonstration of vine and fruit tree pruning in the orchard of Mr. P. A. H. Thiele; this was much appreciated by members.

MONARTO SOUTH (average annual rainfall, 14in. to 15in.).

August 12th.—Present: 11 members and one visitor.

TAKEALL.—Mr. G. Patterson, in a paper dealing with takeall, said working fallow land dry in the spring time had a tendency to promote the disease. He pre-

ferred burning off to ploughing in dry grass, because it made a better seed bed when ploughed subsequently. A rotation of crops, such as oats, barley, and wheat, would help materially to check the disease. In the discussion which followed there was a consensus of opinion that the rotation of crops would prevent takeall, and that three crops of wheat could be grown in succession without danger, for, if the disease appeared in the crops the third year it would be seen only in very small patches.

MURRAY BRIDGE.

August 14th.—Present: 13 members.

PREPARING FOR AND IRRIGATING SUMMER CROPS ON RECLAIMED AREAS.—Mr. F. W. Lehmann read a paper on the above subject as follows:—"To succeed in getting the very best results off the reclaimed areas on the Murray at the present time, summer crops, and lucerne in particular, take the lead. As lucerne requires an immense quantity of water, ideal conditions should prevail to provide all the water that it requires. It is important that the sluice gates leading from the river should be sufficiently large (not under 2-ft. pipes) to enable rapid and economical watering over large areas while windblows prevail, as very often, at the critical time of the year, with a falling river, the strong windblows are of short duration. One sluice gate should supply sufficient water for two blocks of land of six to seven chains each in width; the position of the gate should be between the blocks, watering to the right and left if land will permit. The first procedure should be the construction of the main supply channel leading away from river sluice gate to the full depth of the block. If the block of land be only six or seven chains in width, it would not be advisable to construct the main channel down the centre, as that would cut the block up into little plots, which would entail a lot of turning with implements; but if blocks be 12 to 14 chains in width, then construct the channel down the centre. There are a number of blocks on the Mobilong Swamps which are only six chains wide, and have the main supply channel down one side. These are ideal blocks to irrigate and to work, whereas other blocks from 12 to 17 chains in width, though ideal blocks to work, are difficult to irrigate. I advise the construction of irrigation channels to lead off the main supply channel at every two and a half chains on frontage lands, and when approaching the salt-infested land to decrease the width to two chains or less. It is desirable to construct the channels before proceeding with the grading. In preparing the soil, the most practical conditions should be followed. That is to say, that if insufficient rains have fallen to well saturate the soil the land should be irrigated a few days before the ploughing is proceeded with, to ensure an even depth of ploughing, and to turn all vegetable matter well under, in order to avoid weeds interfering with the grading. I would not plough less than 6 in. in depth. It will depend upon the condition of the soil, and probably upon the weather, when to harrow the land. If ploughing in the summer months, the harrow can follow the plough the same day, whereas in winter the soil may be too wet, and harrowing should only be proceeded with after the land has become dry enough to avoid the soil becoming sloppy. It is not necessary to harrow the land down to a fine tilth at once; it is preferable to allow the land to lie for a week or two at a time, as the effects of the weather will mellow down the soil between the harrowing much more satisfactorily than the harrowing. To obtain the best results on reclaimed land, and to avoid needless trouble and expense, the land should be graded in sections, to enable complete control and rapid methods of irrigation. In constructing the irrigation channels, the soil cast out of the channel and prepared as check banks would hold the water on the particular section being irrigated, and would prevent water encroaching back on plots already irrigated when proceeding on with irrigating lower levels. It may not be possible to grade a block of land on an even level from end to end, but check banks can be arranged to divide the higher and lower sections, the sections abutting end to end, along the same irrigation channel. The irrigation channel, when filled the first time, would prove the unevenness of the land, and would indicate where to remove and where to fill in earth, as it is essential to have strong banked irrigation channels. The first watering would indicate where the soil could not be covered with water without deeply inundating lower portions, and, while under irrigation, could be pegged out and measured

to ascertain to what depth soil would require to be removed and low spots to be filled in. To obtain a satisfactory grading, the land must be allowed to become dry, and should be fairly loose. As I previously recommended deep ploughing, it would be advisable to again plough the land after grading. The surface soil is the ideal soil for germinating purposes, as it has the constituents necessary for germinating small seed, such as lucerne. The lucerne grain requires a moist, fine layer of rotted vegetation and soil, which will retain moisture and contain the necessary strength to force the plant into a strong growth. Again the deep ploughing will provide the opportunity for the plant to force its tap root down after the receding moisture, and not necessitate a second early irrigation, which is so disastrous to the tender young lucerne plant. The month of September is the most suitable time to sow lucerne, as the mild weather and prevailing rains will ensure a quick growth. Low-lying lands may be sown later, but must be free of salt. The quantity of lucerne seed to be sown per acre greatly depends upon the strength of the soil. A strong, rich deep soil will certainly bear thick sowing, without any die back plants being visible for years. Fifteen pounds of good seed to the acre will provide a fine stand of lucerne; 12lbs. may do so under exceptionally good germinating and favorable weather conditions, but 12lbs. may also fail to provide a satisfactory result if land contains salt. It is essential that the lucerne bed be brought to a fine tilth to avoid seeds trickling down too deeply and to prevent the soil drying out too quickly. Sowing broadcast by an experienced hand has given good results. The sowing should be followed with a light set of harrows. If the soil be nicely levelled down, no rolling need be done, as that helps to pack the soil too firmly, and the result after irrigating will be that large cracks will soon appear when hot weather sets in. Avoid cover crops. Care must be taken in watering a newly-sown lucerne bed, as the water is apt to tear furrows if there be a fall in the land. The greater the number of openings in the irrigation channel the better the watering, as it will then flow evenly over the soil, and avoid tearing the soil away. When irrigating salt-impregnated land it is absolutely necessary to have flowing water over all the land sealed to carry away the injurious salts. Care must be taken not to surround patches, but the water must flow in one direction to the drainage channel and the land quickly drained." In reply to questions, Mr. Lehmann stated that wide sluice gates were advisable, so that when a favorable opportunity came the water might be quickly distributed over the land. When the water came on too slowly there was a danger of it soaking away into the drainage channels before irrigating the lucerne. He favored sowing in September, when the land was in a suitable state after irrigating. The warm weather conditions were then suitable for the young plants to outstrip weeds; though it was important before sowing to get land as clean as possible by thorough cultivation. Cover crops he considered unnecessary and to be avoided, as lucerne being a sun-loving plant, should not be shaded by a crop which, for a time, would outstrip it. In regard to replanting lucerne where it had partly died out, usually resowing among older lucerne was unsatisfactory, as the young growth was choked before it could become strong, and it was difficult to cultivate such land to a sufficient depth. It was often better to plough the field up and resow the whole. Mr. A interest was manifested in a cultivator for working established lucerne. Some machines tore up or cut the crowns too severely, but a lucerne renovator had been placed on the market which had proved a great success, because it loosened the soil around the plants, and damage was reduced to a minimum.

PAKILL WELL (Average annual rainfall, 16in. to 17in.).

August 1st.—Present: 10 members.

FOLLOWING.—Mr. M. W. Johnston read a paper on following, in which he said that two systems of following were necessary in that district, one for the land with mallee shoots on it, and the other for country which had been thoroughly cleared, and was liable to drift. Dealing first with the bush land he said that it was best to follow in June or July, with mouldboard ploughs to a depth of 3in. or 3½in. on flats, and from 2in. to 2½in. on sandhills. If the flats and hills were very thick with shoots, &c., the land should be harrowed and the flats should be worked with cultivator and harrows in September or October to kill any weeds and prevent the land becoming too hard. It should then be left to the sheep until after the harvest.

If rain fell after harvest every effort should be put into cultivating and harrowing, because those workings, at the end of summer, when moisture was in the ground, were splendid for the crop. If there were no sign of weeds he recommended drilling in and harrowing behind the drill. With land that had been cleared the task was more difficult, because of the drift. It was best to fallow the cleared land and not disturb it again until harvest. If any rain fell at the end of summer, however, it should be worked over.

SHEEP.—A paper on this subject was also read by Mr. J. W. Johnston, who insisted that sheep were a necessity on the farm to provide meat and keep the fallow free from weeds. Sheep bred on the farm were much more quiet than those brought from other districts, more especially if brought from stations. Quiet sheep were the most profitable. He preferred Merino-Lincoln cross ewes for breeding in that district, because of their large frames and quiet dispositions, and also because they were good milkers and good doers. Any of the British breeds of rams, if mated with such ewes, would produce good lambs. If they were kept for mutton on the farm they would be found to be good doers, and would cut a fair fleece. Merino ewes did not make good mothers, and if disturbed by foxes or dogs deserted their lambs. Oats and oatmeal hay should be stored to carry sheep over the early winter in good condition.

ROSY PINE.

June 14th.—Present: 11 members.

SUMMER V. WINTER FALLOWING.—Setting out that he favored fallowing during the months of February and March instead of June and July, Mr. C. Lee, in a paper advocating that proposition, urged that in the first place, by that method a better germination of weeds would be secured and that six horses would do as much work in February as eight could perform in June or July, and look much better for the feed which they would get. More stumps would come out in February than June, a big gain to a scrub farmer. Every scrub farmer should aim at improving his land for sheep-carrying purposes, and to that end should plough 250 acres of stubble land in February and March, after burning off, and allow the land to remain in the rough furrow throughout the winter months. About the middle of September he should assist his sheep and other stock to get rid of the weeds and rubbish as quickly as possible. He preferred using the disc harrow or harrow, to be followed by a thorough harrowing, to destroy the weeds, before turning the land over, as a final finish before harvest with a mould-board skim plough to a depth of not more than 3 in. As the land would then be in a fine condition he preferred to leave the land rough after the final ploughing. If any weeds should appear after any summer rain he would run sheep over the land, because they would tend to pack the soil and keep the land from drifting. An advantage to be derived from that system was that, when seedling had been finished, the horses could be turned into the paddocks to recoup their depleted energies. The farmer would have more time to deal with the necessary work of clearing stump shoots and other rubbish off the fallowed ground before commencing to work the land again in September. There would also be five or six months good pasturage off the fallow during lambing time when it was most needed, and the droppings would enrich the soil when finally turned under in the spring with the green growth. Winter rains would soak in better and the moisture be more evenly distributed through the fallowed field if broken up early than if ploughed in June or July. Stable manure was the best fertiliser for sandy land, because it needed organic matter and nitrogen to make it productive. Failing sufficient stable manure a crop of rye, with which red clover, vetches, or even oats had been sown, could be turned in. It could be sown in February and ploughed in and allowed to go on for feed until September, when it could be ploughed in to a depth of 4 in. or 5 in. to ensure a good covering for the green manure. If successful it could be sown every third year. Phosphoric acid, as contained in superphosphates, varied in its results proportionately to the humus in the soil, hence the humus might be regarded as a retainer of phosphoric acid in an available condition, an important indication of the necessity for maintaining the supply of organic matter in the sandy soils, which they were constantly manuring with superphosphates with very disappointing results. Mr. F. G. Bonnin was averse to making the second ploughing so deep. The subsoil should be packed tight, and unless rolled the condition would be

conducive to takeall. Sheep would tend to make sand drift instead of packing it. Mr. C. E. Schiller remarked that the object of fallowing was the conservation of moisture, an object which would be defeated by ploughing in February. It was almost impossible to get the plough into the ground in dry weather. It would be a mistake to leave cultivating the land from February to September, because the rubbish would be too high to deal with. He favored the green manuring of sandhills, but preferred to feed it off, because the sheep's droppings provided humus. Working land down very fine was a mistake, because it drifted too easily. Mr. M. A. McCabe could not see how fallowing could be done in February, because by the time all the harvest work had been finished it was necessary to push on with seeding. Mr. A. Sands was against summer fallowing. Mr. R. T. Hay favored summer fallowing, but was against leaving it until September before turning back, because the soil was becoming too dry, and then it was best to leave it alone.

WAIKERIE (Average annual rainfall, 8.89in.).

August 11th.—Present: 31 members.

SHEEP ON IRRIGATION AREAS.—The subjoined suggestions, which he considered would be beneficial to the district, were made in a paper read by Mr. J. L. Smith:—(1) That every settler should have a plot of lucerne fenced off securely against dogs. The plot should be not more than a chain in width, but as many chains as possible in length. Hurdles should be placed in front, as well as in rear of sheep, to prevent them becoming bloated, and to give the portion grazed over a chance to grow. (2) The plot should be carefully cultivated and manured in order to provide ample feed for the quantity of stock to be kept on it. (3) A one chain by two chain plot should be sufficient to start with, say, a dozen sheep, at the end of September. The settler would kill seven or eight sheep, and then, for the remainder of the winter, when the lucerne had ceased to grow, he would have fewer sheep to provide for. Sheep might be purchased at Kapunda, which was a good market, trucked to Morgan, and then driven to Waikerie. Farmers should co-operate in their purchases. (4) The cost of constructing the fence would be £6 for a two chain by one chain plot (hurdles £4). Sheep, at present rates, would cost 35s. per head, and with 1s. 6d. for trucking, could be delivered in Waikerie for 36s. 6d. The sheep when killed should yield 60lbs. of mutton, which was 7½d. per pound. Against that was the skin, which would be worth anything up to 16s. and, if well woolled, perhaps more. The fat, head, tongue, and liver were worth 3s., which reduced the cost of the mutton to 17s. 6d., or 3½d. per pound, which was cheap meat. If a whole sheep were too much for one family, neighbors might kill alternately, and avoid the necessity for using salt meat. Mr. E. Jaeschke said that he had kept 500 sheep on five acres of lucerne for three months. The lucerne was cut and fed to the sheep. He preferred mating a Merino or Shropshire ram with Lincoln ewes for lamb raising. For feeding off rubbish growing on fruit blocks he recommended Merino sheep reared on grass country, and not saltmarsh-reared sheep, because they would eat the trees and vines first.

WILKAWATT (average annual rainfall, 16in. to 17in.).

August 14th.—Present: 11 members and two visitors.

PIG RAISING.—Dealing with the subject of pig raising, Mr. E. W. Brooker, in a brief paper, recommended that the pig yards should be built on sloping ground, with the sheds facing the east to provide shade in the summer time. There should be a small paddock adjoining for exercise until the pigs were ready to be fat-tened for market. Feeding troughs should be made of curved metal to facilitate cleansing. The boar should come from a good strain and be selected from a large litter. It should not be used for stud purposes until eight months old. The sow should be of kindly disposition, and have 12 or 14 well-formed teats. A sow which tended to fatten quickly was not the best from which to breed. After service the sow should be paddocked, where there were water and shelter, in order that she might have exercise and not grow too fat. She should be kept quiet. Only short straw should be used for bedding a sow with suckers.

STOCKING THE MALLEE FARM.—Master K. Bowman read a short paper on stocking farms on the mallee. He expressed the view that the farmer should breed sufficient horse stock to replace the worn-out members of the team. Jersey cows and Berkshire or Middle York pigs were most suitable for the mallee farm.

BERRI, August 9th.—Mr. W. R. Lewis read a paper on the fertilising of the orchard, and it evoked considerable discussion.

BOOKPURNONG EAST, August 5th.—Mr. H. E. Phillis read a short paper on the value of farmyard manure. He favored putting the manure on the land with drag and fork. The chief value of farmyard manure was in the vegetable garden. Considerable discussion followed.

COONALPYN, September 8th.—Mr. J. F. Pitman read a paper on spring and bridle draught, in which he expressed preference for the spring draught, because with the bridle draught the whole set of brilles was in constant motion, and the parts were continually wearing, whereas with the spring draught each furrow jumped independently of any other, and only operated on its own spring. Mr. I. Angel read a paper on the implements required on a scrub farm, and said that he preferred a five-furrow mouldboard plough, spring draught; a disc cultivator to work up the fallow; a 15-disc drill worked with four horses, disc harrows, a 7ft. damp-weather stripper, a motor winnower, and a fire rake. Mr. Whitehead preferred a fine cultivator or skim plough for working the fallow. With a motor winnower a damp-weather on the stripper would not be necessary. Mr. Wall favored a big acreage and big implements. Mr. Venning preferred narrow implements until the land was cleared.

FORSTER, August 12th.—In a consideration of the amount of superphosphate per acre for dressing land, Mr. W. Searle, in a short paper, said that last year he had put on a heavy dressing, rather than carry the super. over, but the crops had not been very good. In the present year, with the same dressing, his crop was looking better than surrounding crops. Mr. Jas. Searle said that it would require a very heavy crop to make a heavy dressing of super. profitable. Mr. W. Day said that a dressing of 140lbs. per acre did not pay. He advocated 80lbs. per acre. Mr. C. Payne said it was more profitable to carry over super. than overdress.

GERANIUM, August 5th.—SHEEP ON THE FARM.—In a paper on this subject Mr. W. A. Stacey expressed a preference for the crossbred. The quality of the sheep, both ewe and ram, should receive careful attention. In view of the shortage of sheep he thought every farmer should retain the best of the ewe lambs for breeding purposes, otherwise good crossbred ewes would become almost unobtainable. A good discussion followed. Mr. F. Norton said that it was not advisable to depend upon natural feed in raising fat lambs, and if cross breeds were raised it would be necessary to maintain two flocks of sheep, unless crossbred ewes could be purchased. Sheep saved the work of a team on the farm.

KI KI, August 12th.—Mr. E. T. Cooley read a paper on mallee farming, in which he advocated, after rolling and burning off, early ploughing to a depth of 2in. to 3in., which would ensure a good seed bed, bury the ashes, and would not turn up too much sour ground. By using a four-furrow share plough, with as much draught as could be worked comfortably, it was possible to plough out 30cwt. or 2 tons of stumps per acre, which could be marketed from 5s. to 10s. per ton. At the lower figures the return would be 12s. per acre, which would just about pay the expenses of ploughing and the labor of picking up and carting the stumps. All new land should be harrowed twice, once lengthways and once across, which disturbed the rubbish and ensured the seed being well covered. Land treated in that way would have much better prospects of producing a crop if the spring were dry, because the depth of the ploughing would allow the plant to take a fairly deep root and the pulling out of the stumps left a considerable area practically cleared.

MANTUNG, August 10th.—Mr. G. N. Baker read a paper on the care of farm implements, in which he advocated a timely overhaul of all the farm implements, in order that they might be in perfect condition when required for use. A good substantial weather-proof shed for housing the implements and machinery was also an essential, and it was there that the farmer should employ wet days in overhauling, cleaning, and painting his implements and replacing fittings.

MORGAN, August 12th.—The care of the horse was dealt with by Mr. I. Pope in a short paper, in which he advocated greater attention to the fitting of the blinkers, collar, and hames, also that the dry sweat should be cleaned off the collar before it was used, and the stuffing of the cart saddle frequently attended to in

order to avoid any chance of giving the horse a sore back. The swingletree should be wide enough, when a horse was worked in chains, to keep the chains well off the ribs. The shoes should be frequently attended to, and not allowed to remain on too long.

POMPOOTA, August 24th.—A discussion took place on the question whether it was more profitable to sell milk or separate it, and the opinions were about equally divided. Those in favor of selling the milk urged that it brought in an immediate cash return, which was an important advantage to those who had no capital. On the other hand, it was contended that it was necessary to separate the milk in order to feed the pigs, which were one of the most profitable animals on the farm.

RAMCO, September 18th.—A discussion took place on the question whether early or late pruning of vines was the more advantageous. One grower stated that late pruning—after terminals had commenced to shoot—appeared to increase the yield. One of his rows, which had consistently given the least yield, had, when pruned after the terminals had commenced to shoot, shown an appreciable increase in yield. Mr. R. Stanley expressed the opinion that if such a practice were persisted in, the vines would show a weakened growth.

ROSY PINE, August 9th.—Members discussed the best method of destroying lice on pigs; the relative values of vertical and horizontal engines; the best food for a calf, when there was insufficient milk; and the most suitable age for the castration of colts.

WOODLEIGH, August 12th.—Mr. F. Petch read a paper on mixed farming. Discussion followed, and it was agreed that it was not profitable to breed surplus horses for the market. Only sufficient for maintaining the full strength required on the farm should be bred. It was also agreed that the continuous rearing of chickens, without changing the rooster, was the cause of most of the setbacks received in the poultry yard.

WOLLOWA, August 17th.—Mr. J. T. Simper read a paper on the care of farm machinery, in which he contended that the proper care of machinery and the keeping of it in thorough repair added years to its life, and was a substantial economy in farm management. All machinery should be housed, properly oiled and overhauled, and the woodwork painted at least once in two years. A blacksmith's shop was essential on a farm as a convenience, to keep the repair bill down and prolong the life of the machines. Supplies of nuts and bolts, &c., should be kept, so that when there was a breakage it could be effectively repaired.

SOUTH AND HILLS DISTRICT.

CYGNET RIVER.

August 10th.—Present: six members.

REARING AND FEEDING CALVES.—The calf should be taken from its mother, declared Mr. A. W. Miller in a paper entitled "Rearing and Feeding Calves," within 24 hours of birth, and 12 hours should elapse before an attempt was made to feed it. It would then be thirsty and take feed readily. For the first 10 days milk fresh from the cow should be given. Some of the morning's milk should be saved and given, sufficiently warmed, at noon. The change from fresh milk to skim milk should not be made too suddenly. A beginning should be made by giving skim milk at midday until the calf was a month old, and then all skim milk should be given at regular times, and always warm. Too much should not be given at a time. If separator milk be used, a cupful of linseed, boiled to a jelly, given at each feeding would enable the calf to thrive. The calf pen should have solid floors and plenty of straw for bedding. It should be cleaned out regularly and whitewashed occasionally. When two months old the calf or calves should be placed in a paddock an acre or so in extent securely fenced. A water trough should be provided, and feed boxes, in which bran, chaff, and, if possible a few oats should be placed, because the calf must be kept thriving. As much milk as the calf could assimilate

should be given to it. If there were plenty of green feed the calf should have it, but the skim milk should be continued until it was four months old. At 12 months old it should be able to look after itself. Mr. R. Loader contended that a calf could look after itself when eight months old.

HARTLEY (Average annual rainfall, 15in. to 16in.).

August 9th.—Present: 16 members.

FARM APPEARANCES.—Mr. C. M. Hudd read a short paper dealing with the appearance of the farm, in which he advocated the planting of trees, keeping the fences in good repair, and having a place for everything and everything in its place, otherwise valuable time would be wasted in looking for things. Broken tools should be repaired at once, and machinery overhauled a couple of months before being used.

FALLOW AND ITS WORKING.—Mr. F. Clark read a short paper on fallow and its working, in which he declared that he was averse to growing summer crops on fallow, because it took the fertility out of the ground and permitted weeds to grow.

WATER TANKS.—The cheapest and best of water tanks, declared Mr. J. M. Hudd, in a paper discussing that subject, was one constructed of bricks and cement, and should hold about 9,000 gallons. It should measure 14ft. 3in. diameter, by a depth of 9ft. on the inside. A foundation 9in. in depth should be dug out and filled with concrete to a depth of 5in. That should be covered over with straps of wire from the centre to the circumference, the ends being turned up, and then another 4in. of concrete put in. One row of a 9in. brick wall should be laid and then a 4in. row, or a single brick all the way, and held together with three parts sand and one of cement. When the wall had been completed, three bands of pig netting (150 yards) should be laid around the tank and tightened with a wire strainer. Then nine rows of No. 8 white wire should be placed in the same way, and the zigzag should be pulled to take up the slack. The wire should be flushed up with five of fine gravel and one of cement, and again with five of sand and one of cement. About lin. of cement concrete should then be put in (3 to 1), and it should be plastered with a mixture of two of fine sand and one of cement. The cost would be as follows:—2,200 bricks, £4 19s.; cement, 10 bags, £4 4s.; 50 yards netting, £1 7s. 9d.; 4cwt. wire, 10s.; four bags lime at 2s. 6d., 10s.; labor, 12 days at 8s., £1 16s.; four loads gravel, two loads of sand. Total, £16 6s. 9d.

INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

August 10th.—Present: seven members and nine visitors.

CARE OF THE BREEDING EWES.—Under this title Mr. H. J. Meyer read a paper in which he urged that the utmost care and attention should be bestowed on lambing ewes. In mating, there should be a ram to every 50 ewes, but the more rams in reason the better, because the lambing season was then less protracted. If Lincoln rams were used, those with small heads should be selected in order to minimise the difficulty of the ewes in lambing. A month before lambing the ewes should be crutched, but great care should be taken in performing that operation, or more harm than good might be done. They should then be placed in a well-sheltered paddock with not too much feed, in order that the ewe might gain exercise in hunting for her forage. The ewes should be visited once or twice every day, especially if a Lincoln ram be used, because the maiden ewes would, in many cases, have great difficulty in lambing. It would be necessary to expend time and patience in walking about the ewes, which suffered from cramp or exhaustion after lambing. When the circulation was restored the ewe could be left to take care of herself. In the case of ewes which dragged their hind quarters along the ground and were unable to lamb—and there had been many such cases that year—the condition was serious, and the chances were that they would not recover. After those ewes had been relieved of their lambs, they should be located in a warm place and allowed to rest. A dose of brandy or other stimulant if the weather were cold, would do good. If the ewe would not take to her lamb she would be placed in a small yard or tiot up in the paddock, a method which he had adopted with great success. It was essential that all dead lambs should be removed at once. When the lambing was over the ewes and lambs should be placed in a paddock with the best feed procurable, so that the lambs might not receive a check, especially was that the case

in respect to export lambs, which required abundance of feed. A ewe and lamb were equal to two dry sheep in the amount of feed they consumed. When three weeks or a month old the lambs should be marked. In driving to the yard it generally occurred that at the gateway the lambs all hung to the outside of the flock, and unless care were taken, there would be a break away. Having yarded the sheep it was important that the instruments should be bright and clean, or else there would be a great danger of loss through tetanus. The lambs should not be put back in the yard with the ewes after the operation, but should be placed in a different yard, where they would escape the knocking about so detrimental to them. Care should be taken when the flock was turned into the paddock again to see that the lambs, especially the very young ones, were mothered. The ewes became unsettled after yarding and were liable to wander off. The young lambs generally got down just inside the gateway, and, if the mothers were not steadiest, there was a risk of some lambs not finding their mothers. After the severe time they had been through they would probably succumb, unless they got a drink pretty quickly. In the discussion which ensued reference was made to the number of ewes which have this season shown a decided weakness in the back, causing them to drag their hindquarters, and, at the same time, were unable to give birth to their lamb without assistance.

INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

September 7th.—Present: 16 members and one visitor.

HOW TO MAKE FARM LIFE ATTRACTIVE.—Commencing with the declaration that no trade or calling should offer greater attractions than that of the full, free country life, Mr. H. J. Jagger in a paper "How to make Farm Life Attractive," proceeded that any business to be attractive must be a paying business, and if they wished rural pursuits to be attractive, they must see that they were paying propositions. There were four reasons why farm life should recommend itself to the young man—(1) Its comparative certainty of success, (2) its independence, (3) because it offered scope for the greatest intelligence of the nation, and (4) the hopefulness of the future. The sons on a farm should always receive a reasonable allowance. It often happened that whilst the farm hand received £2 or £2 10s. per week, the son had to scratch along with a few shillings. When they were old enough the sons should be made partners, not necessarily taking an equal share with the father, but a portion of the profits, if only 5 per cent., or, in the case of the girls, they should have the management of the poultry, reserving sufficient eggs and poultry for the household. Where there were several sons it was advisable to give them the management of different departments, and they should be consulted and encouraged to express their opinions as to various farm questions. Generally the welfare and the convenience and comfort of all on the farm should be studied as far as possible.

MILANG.

August 12th.—Present: 57 members and several visitors.

CONSTRUCTION OF FARM BUILDINGS.—Given good material and properly constructed, stone buildings were the best and cheapest, insisted Mr. D. S. McIlhenny in a paper which discussed the construction of buildings on a farm. He recommended a circular roof of galvanized iron, because such a small amount of timber was required, and it could be made large enough to comprise stable, cowshed, chaffhouse, and separator room. It would not leak and would resist almost any wind. Running doors, constructed of galvanized iron and oregon, should be provided. If properly hung, they could be opened and shut with the utmost ease on the roughest days. The best kind of floor for cowsheds, stables, pigsties, and, in fact, any farm buildings, could be made by breaking down limestone to a depth of six or seven inches, graded to the slope required for drainage. It should be well wetted and rammed. Then three parts of clean sand should be mixed with one of cement, wetted to the consistency of stiff mortar and spread over the stone with a trowel. It should then be rammed lightly, the surface having been wetted with a little water sprinkled on with a watering can. Such a floor would bear hoof and wheel traffic without wearing. He knew a floor of that description on which from 15 to 25 c.w.s. were milked throughout the year. It was cleaned and swept twice a day and although it had been down two years it showed no sign of wear. The floor was not

expensive if the stone could be obtained readily, and one cask of cement would be sufficient to cover 300 square feet. Ramming the cement produced a surface slightly rough, which prevented the stock from slipping. It was much cheaper than brick, lasted longer, and could be easily put down by anyone on the farm.

URADLA AND SUMMERTOWN (Average annual rainfall, 44.35in.).

July 3rd.—Present: 15 members and two visitors.

WATER IN THE HILLS.—A water supply of 4,000galls. or 5,000galls. per hour was necessary for a farm of 12 or 15 acres in the hills, declared Mr. J. S. Williamson, in a paper devoted to the consideration of water in the hills. In selecting a site for the well a spot should be chosen where the supply was not too deep. It was advisable to find two parallel makes of country rock and sink the well about 100ft. to the east of the spot where the two formations junctioned on the surface. That would ensure cutting the junction of the two formations at a depth of 100ft. or thereabouts. It was necessary to sink to that depth to ensure a good supply. Places on which the water remained until the summer advanced and then dried up should be avoided in seeking well sites, because it was evident that the rock was too hard to absorb the water. When the well had been sunk a drive should be put in at the bottom, running east and west. The timber used should be 9 x 2, and jammed (not "joggled") in. Timber "joggled" in was always loose, and would not hold in bad ground. A 6 h.p. or 8 h.p. engine would be required, a duplex pump, and a concrete tank to hold about 20,000galls. The tank should be erected in a high position. All mains should be 3in. or 4in. He was averse to large holes, because the well was much better and just as cheap. The pump in the well was easier to attend to and would throw twice the quantity of water for the same sized pump.

WOODSIDE (Average annual rainfall, 31.85in.).

August 16th.—Present: six members.

RE-ESTABLISHMENT OF OUR PASTURE LANDS.—Mr. J. Caldwell, in a paper dealing with the re-establishment of pasture lands in the district, said that three factors had operated in impoverishing and exhausting the pastures in that district:—(1) Cropping the land and leaving it to the mercy of the weeds; (2) overstocking and leaving the ground so bare that the winter rains washed away all ingredients which might have nourished or re-established the pasture; and (3) the encroachments of the natural scrub when the grass has been fed off. To combat those influences, he recommended the thorough drainage of all lands used for pasturage, each valley being provided with a deep centre drain, with cross drains leading to it. The drains could be taken out with a mouldboard plough at the end of winter so that the ground might be returned before the following winter, and so prevent the ground being washed away. Cultivated land, intended for pasturage, should be sown with some forage seed as soon as the crop had been harvested. Exhausted virgin pastures should be given a full year's rest. Clover hay, cut when ripe, should be fed to the stock in the paddocks, in order that the seeds might be distributed in the droppings and help to re-establish good grasses. The improvement of the pasturage should be taken in hand systematically and not left to chance. Scrub should be broken down, the land ploughed and sown and turned to some account.

CHERRY GARDENS, August 5th.—Discussion took place on the clipping of horses. Mr. C. Ricks found that horses when clipped did not sweat so freely and were much easier to groom. Though the winters were more severe in England than in Australia, clipping was more general in the former country. When horses were clipped it was necessary to provide good stabling for them, and they should be rugged when not working in cold weather. Mr. H. Jacobs favored half clipping, or skirting, which did not necessitate the use of rugs. That portion of the body requiring most protection from cold retained its natural coat, and the ribs and flank, which usually remained wet with sweat for the longest period, dried quickly, and contributed to the comfort of the horse. Mr. F. Brumby, a visitor, said that the condition of a horse was more easily maintained when it was clipped, and it was not so tired nor sluggish after work.

CHERRY GARDENS, September 12th.—A discussion took place on the question whether it was profitable to grow wattle bark, and the consensus of opinion was that at the low prices which had been ruling in recent years and the increased cost of labor the cultivation of wattle bark was not profitable, though wattle might be grown on some of the poorer lands.

CYGNET RIVER, September 12th.—Mr. R. Loader read a paper dealing with the care of farm machinery, advocating initially the necessity for keeping it in a shelter shed. If there were no shed available or possible a waterproof covering might be used, and the ironwork coated with waterproof paint. The machinery in use should be oiled often, including even the pull links on the plough. Drilling machines should not be lubricated with oil, but soapy water. Discussion ensued, in which many questions were asked and satisfactorily answered.

MACGILLIVRAY, August 8th.—Mr. A. J. Nicholls read two papers, one "Green Manuring," the other "Growing White Mustard." Discussion followed, members generally agreeing that it would be advisable to observe the effect of the operation on the following crop.

MOUNT BARKER, August 9th.—Mr. Stephenson read a paper on the ideal farm, in which he pictured a holding on the high road, near a railway, and divided into small paddocks, well fenced, and with a homestead surrounded by a hedge. Shelter should be provided in the paddocks for the cattle, and there should be permanent water, best of all a running creek. On the high ground the stables, cowyards, &c., should be placed in order that they might be properly drained. There should be an orchard and a vegetable garden.

NARRUNG, September 9th.—In a paper pointing out how spare time might be spent on a farm, Mr. J. B. Steer advised first attention to the machinery and plant generally. All the harness might be oiled with neatsfoot oil which had been warmed, and the chains might be repaired. Iron swingletrees could be made from old plough beams, and spreaders could be made with $\frac{1}{2}$ -in. round iron, which was lighter and handier than wood. The seed wheat bags should be patched and put away, in order to avoid delay at harvest time and the extra expense of paying harvest rates of wages for mending bags. The bags might be stored in a zinc-lined case or suspended on a rail hanging by wire from the roof of the barn. The stables and yards should be cleaned, and the drainage—a very needful matter—attended to. Cultivator shares might be sharpened, and, if the shares were chilled hard, their life would be almost doubled.

SOUTH-EAST DISTRICT.

KYBYROLITE (average annual rainfall, 22in.).

August 16th.—Present: nine members and three visitors.

FEEDING OFF CROPS.—At the outset of a paper on feeding off crops, Mr. H. R. Scholz advanced as reasons for the practice that, in many cases, crops might have been sown too early, or, owing to rapid growth, might have become too forward for the season, and in such cases feeding off prevented them growing too rankly and going down too easily. When it had been fed off the plant stood better and was retarded in growth, attaining only the medium height of 3ft. or 4ft., which yielded more heavily than crops which had not been fed off. Three years ago he had put 130 sheep in a 30-acre paddock, sown with Federation wheat, for 16 days. From that land he harvested 10 bags of wheat per acre. In the following year, finding the crop too high, he put 130 sheep on 13 acres of Federation wheat for three weeks, and then turned 350 ewes, with as many lambs three months old, on to it for a fortnight, and the crop was eaten off bare and looked like fallow. There was a drought that year, but he reaped 12 bushels per acre from that land. Adjoining ground, which had not been fed off, yielded only 9 bushels. Feeding off with sheep improved the seed bed, as well as the plant itself, and the ground was trodden firm by the sheep in feeding, facilitating the draining off of surface water. Farmers who owned about 100 sheep could only effectively arrange for feeding off by having several 30-acre paddocks, and shifting the sheep as occasion required. Mr. A. Bradley said that feeding off tests at Roseworthy gave results

below the average, but everything depended on crop conditions. Oats were more suitable for feeding off in that district than wheat, because of their greater liability to grow rankly and go down. Mr. E. C. H. Schinckel gave instances of good results obtained from feeding off. Mr. S. Shepherd said that he had a striking example of the benefits of feeding off oats last year, when excellent yields were obtained. He was convinced that feeding off was profitable under any conditions. Mr. G. H. Hahn said that everything depended upon the condition of the crop. When the plant was tall and spindly it should be fed off, but in ordinary circumstances, with a good healthy well-stooled plant, he was averse to feeding off.

LUCINDALE (Average annual rainfall, 23.32in.).

August 19th.—Present: 10 members.

RATION SHEEP.—In a paper dealing with the keeping of ration sheep Mr. W. M. Secker said that only really well-conditioned sheep should be killed, and that might be accomplished on a farm by reserving a small paddock for the sole purpose of fattening a few sheep at a time. He always picked out for fattening aged sheep, and he avoided selecting well-wooled animals. It was a mistake to use poor mutton for domestic purposes, because it was full of sinews, and was flavorless, besides yielding no fat or dripping. One well-conditioned sheep provided as much meat as two poor ones. Good mutton was better flavored and more nourishing than poor stuff. In winter it was of no consequence if the ration sheep were large, because the meat would keep in cool weather, but, in the hot season, he selected smaller sheep, because there was always a chance of it going bad. Where families were small it was always necessary to cull some of the mutton. Killing poor sheep was wasteful, reducing unnecessarily the numbers of the flock and the wool clip. In the discussion which ensued Mr. L. McLunes said that he preferred to sow about 10 or 12 acres with barley, and pick four and six-tooth culs for wool, and fatten them on the barley. They were better to eat than old sheep, whose meat was tough. Mr. J. McLunes said that the flesh of old sheep, though they were in prime condition, was tough. Mr. T. Ferguson said that in breeding a special line of sheep it was profitable to keep the old sheep, provided their wool production did not deteriorate. The old sheep should be mouthed, and the teeth of those which were broken mouthed should be extracted, because such teeth were usually long and loose, and prevented them from getting a good grip of the grass. After the removal of the teeth the sheep usually deteriorated somewhat, but after a brief period would fatten much more effectively, because they were able to get a better grip of the grass between their gums. Mr. A. Carmichael believed in fattening and killing off old sheep, and also in the extraction of the teeth from broken-mouthed animals. Mr. J. McMorro stated that it was the experience of butchers that old sheep required to be hung three or four days before using, to make the flesh tender. Mr. P. Dow was of opinion that it depended on the quality of a man's hand whether he could breed sufficient lambs to enable him to kill the young sheep for his own use. Mr. T. Ferguson produced a bushel of annual saltbush seed for distribution. He had grown it himself with good results. A patch which he irrigated grew to a height of 6ft. Discussion took place on the blowfly trouble with sheep, and the general opinion was that breeding ewes should be "breached." Mr. W. M. Secker stated that he had breached about 700 breeding ewes, and they produced half a bale of wool. Only three of the 700 ewes "breached" had been touched with flies, and that happened through the ewes getting down in lambing. Mr. P. Burke said that he had no trouble with the ewes which were "breached," but a great deal with those which were not.

MILLICENT (average annual rainfall, 29.25in.).

August 8th.—Present: eight members.

SUGAR BEET.—In a paper dealing with the growing of beet Mr. H. Hart said that last season, which was very dry, he received the seed too late. He sowed on October 18th, in drills 3ft. apart, 90 plants per chain. The crop weighed 116lbs. without the tops, equal to 12 tons per acre. The ground was ferny land, and white sand with a little clay in the subsoil. Many of the leaves were scorched by the

hot weather. Growing beet was very similar to the growing of mangolds. He favoured drills wide enough apart for horse hoeing. The plants sent out roots for moisture and manure. The quantity of seed required, if good, was 4lbs. to the acre, pressed into the soil about half to three-quarters of an inch for early sowing and 1in. for later, when the soil was becoming dry. A good garden drill was best to use, unless an ordinary corn drill was contrived, with pressure wheels to fix the seed in thoroughly. In the course of discussion it was agreed that sowing need not be so early as at Maffra, and that the middle of August was time enough. Several members decided to try experimental plots and to have samples sent to Maffra for analysis.

NARACOORTE (Average annual rainfall, 22.60in.).

July 8th.—Present: 34 members.

POTATOES AND ONIONS—HOW TO GROW THEM.—To prepare ground for a potato crop, observed Mr. H. J. Coad, in a paper dealing with the method of growing potato and onion crops, it should be ploughed to a depth of 6in. some time before planting. If the land were stiff or very lumpy it should be worked down until a fine seed bed had been obtained. Then, if bone super. or other manures were to be used, they should be drilled in to a depth of 3in. The potatoes should be ploughed in, in rows 3ft. apart, but the seed should not be more than 3in. under the soil when the next furrow covered it. Manure should be drilled in rather than put in the rows with the seed, as the latter method tended to burn the plant to a certain extent, especially with cut seed, and the plant was weakened. If farmyard or stable manure were employed it should not be spread too thickly, because potatoes did not require much manure. The manure should be ploughed in 6in. in the same way as other manures; but if stable manure were used, 2cwt. or 3cwt. of super. per acre should be drilled in with it. After planting, the harrow should be run over the ground, which would then have a fine surface. Seed potatoes should be carefully picked over before planting, and all those with delicate shoots eliminated, because it was useless to prepare land well for inferior seed. He preferred to plant Reiskins, which did well on either dry or moist ground. Snowflake did well if planted late on moist, swampy soil. They matured slowly, but grew rapidly after the early rains, and the potatoes grown on swampy land kept better than those grown on dry land. Early potatoes should be planted about the end of July in order that the young potatoes might miss the frosts. Summer crops should be sown about the end of October, and would be ready in March. If potatoes had matured by the middle of March they should be dug before the early rains, because, if left in the ground after the rain, they would rot. Potatoes should not be stored where the sun could shine or the wind blow on them, because their flavor became ruined thereby. Potatoes should be kept in a hole in the earth, covered over with plenty of straw. When taken out they were as fresh as when just dug. Seed should be covered over with damp bags in order to make it commence to shoot before planting. When the plants were 6in. in height all weeds should be hoed out. He was averse to using a "scuffler" to mound the potatoes, because it disturbed the outside roots and did more harm than good. Most farmers planted from 500 to 1,000 onion plants every year, and as they were easy to grow, they were often planted in a slovenly fashion. He preferred using fowl manure for onions, but it should not be spread too thickly, because it was liable to burn the plant. With 4cwt. or 5cwt. of artificial manure to the acre onions did well. They should be planted in rows 2ft. apart, with 8in. between the plants. He had tried early and late planting, and preferred having the plants transplanted as early as possible. About the middle of May was the best time to transplant, because the early onions were always milder than those grown later. The best varieties to grow were the Brown and White Spanish, because they matured early; but too many of that kind should not be planted, because a good, long-keeping onion should be grown as well. Brown's long-keeping onion was a good keeper. Other good varieties were:—Pineapple (a very large grower), Silver King, and Mammoth Pompeii. The last-named was an Italian variety, and a splendid grower. Onions should be kept quite free from weeds, and that could be very easily done by the use of a light hoe. The onion should be treated in very much the same manner as a potato, first hoeing out the weeds and then mounding up the earth around them in order that the sun

might not shine on the bulbs. In the discussion which ensued, Mr. A. Johnstone said that potatoes used as seed were not really seed in the same sense as wheat. The grain of wheat contained the germ of life, but the germ of reproduction in the potato was contained in the eye, and there was no advantage in grading potatoes for seed. Potatoes flowered and produced seed, just as other plants, but the seed was not used for reproduction.

PENOLA (Average annual rainfall, 26.78in.).

August 5th.—Present: 10 members.

WORKING BLACK SOIL.—In cultivating black soil Mr. P. H. Kilsby, in a paper treating with that subject, recommended that ploughing should be commenced about the middle of February with a disc plough, and continued as long as the disc would work, which would only be until the wet weather set in, when the work should be completed with a stump-jump plough. He preferred the disc because it left the ground more open to the sun and wind and broke down much better at seeding time. He preferred ploughing 4½ in. deep, especially for potatoes, mangolds, and peas, but 4 in. was sufficient for other crops. After harvest the crops which it was intended should be sown should be mapped out, and the variety of seed to be allotted to each paddock or plot determined. The barley area should be ploughed first, because it needed more working than the others. It should be left open until a few weeks from sowing. After the barley ground had been treated the land for hay and oats should be ploughed, and lastly the paddocks devoted to wheat. The land should be worked well before seeding. He preferred for that work the stump-jump cultivator with V-point shares, which stirred the ground well, and made a good seed bed. The ground should be harrowed twice before drilling, and afterwards as well. Seeding time was determined by the season, the general practice being to wait for the rain before sowing, in order that all rubbish might be destroyed and a better seed bed formed than if the seed were put in dry. He advocated sowing for hay in May, 1½ bush. of Algerian oats and 4 bush. of White Tuscan wheat, with 80 lbs. of mineral super. After finishing the hay crop, the oats which it was intended to thresh for grain should be sown. The wheat crop should be put in from the end of May to the end of June, but last year he had derived the best results from Gluyas sown on August 23rd, which averaged 22 bush., but they had splendid rains in September and October. He intended to repeat the experiment this season. He strongly advocated sowing Gluyas in black heavy land. There was no trouble in harvesting it. Barley land should be well worked, as it was the most profitable. It should be ploughed in February and March, cultivated in June and July, and sown from July 20th to the end of August, at the rate of 1 bush. of Duckbill barley and 80 lbs. of super. to the acre. For potatoes black soils should be ploughed to a depth of 4½ in. in May, and worked at least every fortnight thereafter with a good cultivator, and after a few days it should be harrowed, until October, when the ground should be ploughed again, and the potatoes sown. He adopted that method last year, and then, after the potatoes had been planted, he kept the harrows going every few days until the potatoes were too high, and then he put the horse cultivator through them. As a result, all through the summer the ground remained loose, whereas in the next paddock, which had been only treated with plough and harrow, the ground was very hard, and displayed cracks all over it. With more thorough working the results from the black land would be better, and he was confident it would grow potatoes equal to those produced on the Millicent flats. Mr. D. McKay said that potatoes sprinkled with burnt lime were practically moth proof.

At the meeting on July 8th, discussion took place on a paper read many years ago by Mr. Adamson on "Wheat Growing." Mr. Ockley pointed out that Federation wheat had fallen from its prominent position, and had been succeeded by Yandilla King and Gluyas. Mr. Kilsby advocated June and July sowings of wheat, which had yielded, in his experience, 4 bush. or 5 bush. more than he had obtained from May seeding. Wheat was a long way behind Duckbill barley as a revenue producer, 22 bush. of wheat not being equal financially to 65 bush. of barley, the stubble of which was also of greater value than that of wheat. Mr. Moran favored Federation wheat on a black soil, because it was less liable to rust. Wheat would prove far more profitable when a rotation suitable to the plains had been evolved. Replying to a question with regard to bringing grown sheep from the Northern

areas to that district, Mr. D. A. Fullerton said the culy advantage to be gained was that they would yield more wool the first shearing, because they would be carrying more than 12 months' growth before the South-East shearing season arrived. In many cases the flocks brought from the North were only cull drafts. He also referred to the wonderful improvement of much of the country in that district, the unhealthy conditions producing "coastiness" having been removed by a system of drainage.

TANTANOOLA.

August 5th.—Present: 21 members.

AGRICULTURAL EXPERIENCES.—A paper on agriculture was read by Mr. C. G. Searle, in which he detailed his experiences with two plots of land as follows:—
Plot 1.—First year—Ploughed in June; broadcasted with Cape barley and 60lbs. super. per acre; returns, nil. Second year—Ploughed in July; harrowed three times; drilled with 60lbs. oats and 60lbs. super.; returns, two tons of hay per acre. Third year—Ploughed in April; harrowed four times; drilled 62lbs. barley and 80lbs. super.; returns, 30bush. per acre. Fourth year—Ploughed and sown with oats; returns, two and a half tons hay per acre. Fifth year—Ploughed and drilled with wheat, 60lbs per acre, and 80lbs mineral super.; returns, two tons of hay per acre. Sixth year—Ploughed and sown with oats as previously; returns, three tons of hay per acre. Seventh year—Ploughed in March; sown in May with Tuscan wheat, 60lbs. with 90lbs. super.; returns, 32bush. per acre. Cultivation was during a dry period. The wet season prevented a continuation because the land was in a low-lying situation. Plot 2.—First year—Ploughed in February, 4in. deep; cultivated three times; drilled with 90lbs. super. and 62lbs. English barley; returns, 40bush. per acre. Second year—Ploughed in March; cultivated three times; drilled with 90lbs. super. and 50lbs. Algerian oats; returns, three tons hay per acre. Third year—Ploughed in March; cultivated four times; drilled with 90lbs. super. and 60lbs. Tuscan wheat; returns, two and a half tons of hay per acre. Fourth year—Ploughed in May; cultivated twice, harrowed once; drilled with 90lbs. super. and 60lbs. oats; returns, three tons hay per acre. The plot has been sown with wheat for the present season. The use of the spring-tooth cultivator and surface draining were necessary in order that the land might be worked when required.

KONGORONG, September 5th.—At the inaugural meeting of the Branch there was an interesting discussion led by Mr. F. R. Uphill on the disease locally known as "The Coast."

PENOLA, September 2nd.—A report was made that a pest in the oat crops in the district was making great headway. Various local matters were discussed and questions answered.